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The PILOT STUDY in FARM DEVELOPMENT

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TABLE OF CONTENTS

BACKGROUND, OBJECTIVES, AND PROCEDURES

The Challenge 1

Urgent Agricultural Development; Persistent Low Farm Income; Review Problems Related to Low Income

A New Study 5

Contribution of the College of Agriculture;

Objectives; Assumptions

Organization and Working Procedure 6

The Farm Development Team; Working Intensity with Farmers; Working Relationships with Other Offices

Activities of the Farm and Home Development Technicians 12

Selection of the Pilot Barrios; Holding Farmer's Meetings and Classes; Selecting Primary Cooperators; Conducting Farm and Household Survey; Conducting Farmer's Field Trips; Setting up Local Field Research and Demonstration Lots; Holding Field Days; Organizing or Reactivating Associations; Making Farm and Home Visits; Gaining the Confidence of the Farmers; Continuous Search for Suitable Extension Techniques

The Problem of Free Material Aid 18

THE STUDY BARRIOS IN 1958

Barrio Janopol; Barrio Cale; Barrio Linga; Barrio Halang 21

Description of the Four Barrios 24

Rainfall: Characteristics of the Farm Families; Tenure; Land Resource and Utilization; Family Labor Potential and Utilization; Off-Farm Work; Farm Investment; Labor Requirements and Returns of Crops; Gross Farm Receipts; Farm Expenses; Measures of Net Returns; Market Outlets; Credit Agencies Helping Farmers

RECOMMENDATIONS TO FARMERS AND RESULTS

Nature of Recommendations 34
General Recommendations; Specific Recommendations

Illustrations of Experiences with Individual Enterprises 37
Lowland Rice, Upland Rice; Corn; Hybrid Clustered Eggplant; Garlic; Tomatoes; Los Baños Bush Sitao; Poultry; Piggery

Illustrations of Experiences with Specific Practices 56
Credit Financing; Composting; Record-Keeping and Farm Business Analysis; Farm Planning

Illustrations of Experiences with Individual Farmers 64
Farmer Cooperator LH-LAH; Farmer Cooperator MH-MIA; Farmer JL-JDD; Farmer LC-LBM; Farmer PC-PDD; Farmer PJ-PFC

GROUP OBSERVATION

Changes in Farm Organization; Changes in Practices; Changes in the Farm Business 86

CONSOLIDATION OF LESSONS GAINED 95

The Focus of Development Work; Fundamental Problem Areas of Development Work; Whole Farm Perspective; Extension Methods; The Recommendations; The Extension Worker; Workload; The Team Approach; The Philosophy of No Free Material Aid; Lack of Capital; Relative Reaction of Farmers to Innovations; Benefits from Visitors; Potential for Applying Results of Research on Small Farms; More Studies Needed

SUMMARY 106

Appendix
Literature Cited
Definition of Terms

List of Tables

Number *Page*

1 Average weekly earnings of wage and salary workers ... 2
2 Average yearly income of 5,195 farm families ... 2
3 Area planted to rice by cropping season and type of farm ... 3
4 Months of available family labor of 5,195 farm families ... 4
5 Educational attainment and size of farm families in four pilot barrios, 1958 ... 24
6 Farmers classified by tenure in four pilot barrios, 1958 ... 26
7 Land resource and intensity of use in four pilot barrios, 1958 ... 26
8 Family farm labor potential and utilization in four pilot barrios, 1958 ... 28
9 Off-farm work of farm families in four pilot barrios, 1958 ... 28
10 Farm investment in four pilot barrios, 1958 ... 29
11 Gross farm receipts in four pilot barrios, 1958 ... 31
12 Farm expenses in four pilot barrios, 1958 ... 31
13 Farm and non-farm income of farm families in four pilot barrios, 1958 ... 31
14 Market outlets in four pilot barrios, 1958 ... 33
15 Use of credit in four pilot barrios, 1958 ... 33
16 Source of credit in four pilot barrios, 1958 ... 33
17 Purposes for credit in four pilot barrios, 1958 ... 34
18 Contact with agricultural improvement agencies in four pilot barrios, 1958 ... 34
19 Area planted and yield per hectare of three rice varieties in Halang and Linga, 1959-1960 ... 38
20 Results of a local field trial on spacing lowland rice in Halang, October 1958 — March 1959 ... 39
21 Results of fertilizer field trials on lowland rice in Linga, October 1958 — March 1959 ... 39
22 Yield and maturity period of different upland rice varieties in local field trial in Barrio Janopol, June — October 1958 ... 41
23 Results of fertilizer field trials on upland rice in Cale and Janopol, June 1958 ... 42
24 Area planted and yield of hybrid and native corn in barrios Cale and Janopol, June — October 1958 ... 43

LIST OF TABLES

Number *Page*

25 Area planted and yield of hybrid and native corn in Cale and Janopol, October 1958 — March 1959 44
26 Results of local field trial on distancing of corn in Cale, October 1958 — March 1959 45
27 Results of fertilizer trials on corn in Cale and Janopol, May — September 1959 46
28 Number of chicks acquired by breed and month of acquisition in barrios Cale and Janopol, January — May 1959 50
29 Chick mortality by month in Cale and Janopol, January — April 1959 51
30 Proportion of birds immunized in barrios Cale and Janopol, January — May 1959 51
31 Egg production record of four poultry enterprises in three pilot barrios, August 18-29, 1960 52
32 Commercial swine enterprises, January 1963 56
33 The family of LH-LAH, 1957-1958 64
34 The farm resources of LH-LAH, April 1958 64
35 Yield per hectare on the lowland rice farm of LH-LAH, 1957-1958 to 1961-1962 65
36 Cost and returns of LH-LAH, 1957-1958 to 1961-1962 66
37 The family of MH-MIA, 1957-1958 67
38 The farm resources of MH-MIA, April 1958 68
39 Yield per hectare on the lowland rice farm of MH-MIA, 1957-1958 to 1961-1962 68
40 Cost and returns of MH-MIA, 1957-1958 to 1961-1962 69
41 The family of JL-JDD, 1957-1958 70
42 The farm resources of JL-JDD, April 1958 70
43 Yield per hectare on the lowland rice farm of JL-JDD, 1957-1958 to 1961-1962 71
44 Cost and returns, from the farm of JL-JDD, 1957-1958 to 1961-1962 72
45 The family of LC-LBM, April 1958 73
46 The farm resources of LC-LBM, April 1958 78
47 Land utilization, timing, labor requirement and income from crops of LC-LBM, 1958-1959 74
48 Gross crop production per hectare of LC-LBM, 1957-1958 to 1961-1962 75

LIST OF TABLES

Number *Page*

49 Cost and return on the farm of LC-LBM, 1957-1958 to 1961-1962 76
50 The family of PC-NDD, 1958 77
51 The farm resources of PC-PDD, April 1958 78
52 Land use, labor requirement, and income of PC-PDD, April 1958-1959 78
53 Gross production of crops per hectare from 1957-1958 to 1961-1962 79
54 Cost and returns on the farm of PC-PDD, 1957-1958 to 1961-1962 81
55 The family of PJ-PFC, 1958 82
56 The farm resources of PJ-PFC, 1958 82
57 Land utilization, timing, labor requirement and income from crops of PJ-PFC, 1958-1959 83
58 Crop production per hectare on the farm of PJ-PFC, 1957-1958 to 1961-1962 84
59 Cost and returns on the farm of PJ-PFC, 1957-1958 to 1961-1962 84
60 Number of improved practices implemented by 275 farmers pilot barrios, 1957-1962 89
61 Number of improved practices implemented by primary cooperators and other farmers pilot barrios, 1957-1962 90

LIST OF FIGURES

Page

1 Working relationship among team members and the farmers 8

2 Different levels of working intensity 10

3 Working relationships among technicians, farmers, administrators and supporting agencies 11

4 Map of Barrio Janopol 20

5 Sketch showing the location of the four barrios relative to College and Manila 22

6 Rainfall in stations near the pilot barrios 25

7 Pattern of land utilization of farmer cooperator LC-LBM, 1958-1959 27

8 Income potential and labor requirement of some crops, Cale and Janopol 1958-1960 30

9 Capital investment 87

10 Land use 88

11 Gross receipts, farm expenses and net returns 91

12 Comparison of net returns of primary cooperators and other farmers 92

13 Proportion of crop and livestock contributions to gross farm production 93

14 Proportion of farm family disposable production going to the market 94

15 Net earnings to family-furnished labor, land, capital and management, primary cooperators, Barrio C, Batangas, Philippines, 1957-1962 96

16 Net earnings to family-furnished labor, land, capital and management, primary cooperators, Barrio J, Batangas, Philippines, 1959-1962 97

17 Net earnings to family-furnished labor, land, capital and management, primary cooperators, Barrio H, Laguna, Philippines, 1957-1962 98

18 Net earnings to family-furnished labor, land, capital and management, primary cooperators, Barrio L, Laguna, Philippines, 1957-1962 99

LIST OF ILLUSTRATIONS

Page

Contrast in performance between the hybrid and native corn in a farmer's field 17
Protection of cucurbits against fruitflies 17
Diagnosing the problem and discussing the solution right in the field with the farmer 18
Effect of clean culture and proper application of fertilizer on rice 40
Bush sitao in commercial scale 49
Rearing newly bought chicks 54
Labor-saving and sanitary brooder 54
Healthy chicks give a lot of pride and confidence about the future profit and loss statement 54
Confinement of laying poultry 55
Incubator kept by *Mang Dama* 55
Free congenial co-existence of the hen and the skinny pig 57
Tying the pig, a little improvement over uninhibited freedom 57
A temporary improvised hog house 57
A clean and orderly pig pen 58
A sturdy hog house 58
A permanent hog house 58
Castration of fattening pigs at an early age 59
Proper mixing of feeds 59
Immunization against and treatment of diseases 59
Artificial insemination of a sow with semen from a pure-bred Duroc-Jersey boar 60
A newly acquired pure-bred Duroc-Jersey boar 60
A newly acquired pure-bred Landrace boar 60
Mang Tomas fondly and proudly keeps watch over his herd 61
Mang Julian and his daughter observing their herd 61
Compost house 62
A farmer cooperator lecturing to college personnel about his experiences in the farm 104

THE PILOT STUDY IN FARM DEVELOPMENT

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BACKGROUND, OBJECTIVES, AND PROCEDURES

The Challenge

Urgent Need for Agricultural Development

In the early stages of economic development of any country, agriculture must play a crucial role. First, it must provide food for a rapidly increasing population. This is not just a matter of feeding more people. Those advancing on the income scale demand larger quantities of certain types of food, as a result of high income elasticity of demand for high-quality food. They eat more meat, fish, dairy and poultry products, more fruits and vegetables.

Agriculture's second task is to generate much needed foreign exchange. This is done by producing export crops and, equally important, crops that may be used as substitutes for imported foods, feeds or raw materials.

Third, agriculture must provide capital for expansion of industry. Japan and Russia are two examples of how capital was siphoned over from agriculture into industrial development (6).

Finally, the large agricultural population is an important market for the products of industry. The purchasing power of the agricultural sector is a major factor in the expansion of both commerce and industry.

These four are [illegible] to advance economically [illegible] agricultural development. Yet, as attention is focused on the individual farmers and farm families, many are found close to the subsistence level. They contribute little to the city's food supply, to the nation's exports, or capital formation. In this age of rising expectations, how can they [illegible] even their basic needs? How can they fulfill such challenges in a developing economy?

Governments are pressed to provide social services for their "poor and ignorant rural people". In the long run, however, the rural people can best satisfy their needs and wants through their own efforts. Much of their income must come from their resources and activities, and most of their resources and activities are connected with the farm. Progress in the agricultural area as a whole, therefore, depends on the wise decisions and actions of the individual farmers and farm families (10).

Persistent Low Incomes of Farmers

The low level of farmers' incomes in the Philippines is well known. It becomes even more striking when compared with incomes in other occupations. In 1956, weekly earnings of self-employed farmers, farm laborers, and related workers amounted to only P6.70, less than half the earnings of nonfarm manual workers and laborers (table 1).

TABLE 1. *Average weekly earnings of wage and salary workers*

OCCUPATION	WEEKLY EARNINGS
	pesos
Managers, administrators and officials	44.30
Professional, technical and related workers	37.00
Clerical, office and related workers	28.90
Workers in operating transport occupation	21.70
Mine, quarry and related workers	20.90
Craftsmen, factory operatives and related workers	17.40
Manual workers and laborers	16.00
Service and related workers	11.90
Sale men and related workers	10.20
Farmers, farm laborers, fishermen and related workers	6.70
Average	14.10

Source Philippine Statistical Survey of Households, Series 1, Vol. I National Economics Council. May 1958

Another aspect of the problem of low income was brought out by a 1955 survey of 5,195 farms (13). About 49 per cent of the total annual family income of P931 came from nonfarm jobs like fishing, working for other farmers as farm laborers and others (table 2). This nonfarm income accounted for 59 per cent of the total family cash income.

Review of Problems Related to Low Income

Many socio-economic and farm management studies have discussed the causes of and problems related to low farm income. Earlier observations, dating as far back as 1921, are still valid today (4).

TABLE 2. *Average yearly income of 5,195 farm families*

ITEM		AMOUNT
		pesos
Cash receipts		776.00
Cash farm sales	321.00	
Nonfarm income	455.00	
Cash farm expenses		137.00
Net cash available for family living		639.00
Farm products consumed at home		292.00
Total family income available for family living		931.00

Source H. von Oppenfeld, et al., *Farm Management, Land Use and Tenancy in the Philippines.* Central Experiment Station Bulletin 1 (College, Laguna: College of Agriculture, August 1957), 66 p.

One main cause of low farm income can be traced to underutilization of the two basic and relatively abundant resources, land and family labor. Though farms are relatively small, averaging only 2.4 hectares of cropland, land use is highly seasonal. Large areas capable of double-cropping or more intensive land use are cultivated under a one-crop monoculture system, partly because of lack of irrigation or drainage and partly because of the unchanged traditional cropping pattern. This is particularly true in the major lowland rice areas. In 1948, only one-fifth or 21 per cent of the crop area planted to rice produced a second crop (table 3). Only one-sixth of the total rice area was double-cropped. Such land use is in sharp contrast to that in Taiwan or Japan where farmers grow three to four successive crops a year on the same land which carries livestock in addition (5).

TABLE 3. *Area planted to rice by cropping season and type of farm*

LINE NUMBER		AREA PLANTED All Farms	Palay Farms
		hectares	
1	Lowland		
2	First crop	1,182,999	1,011,010
3	Second crop	259,544	211,660
4	Upland	391,534	268,078
5	Total rice area (244)	1,574,533	1,279,088
		per cent	
6	Percentage second crop as of first crop (3/2 x 100)	22	21
7	Percentage second crop as of total (3/5 x 100)	16	17

Source: Bureau of Census and Statistics, Summary Report on the 1948 Census of Agriculture, Manila: Bureau of Printing, 1952.

Related to seasonal and relatively extensive land use is the problem of underemployment. While land is idle and livestock enterprises are lacking, there is little opportunity for productive use of labor on the farm. The typical farm family, according to the 1955 study, had a potential labor force of 28 man months (13). The farm provided only 9 months of productive, gainful employment. Six months were used in off-farm employment, leaving 13 months not gainfully used (table 4).

The underutilization of land and labor has often been noted by our keener local leaders, service workers, administrators, and politicians. In effect, they observe: "Our country is so rich in natural, particularly in agricultural, resources. Why don't we use them to greater advantage?" The frequent answer is that "farmers are lazy, illiterate, uncooperative, conservative, and opposed to change".

It is pointed out, that farm production and, hence, income, can be increased if farmers work harder on their farms, if they do not content themselves with sloppy methods of land preparation, or if they weed and cultivate their crops more thoroughly.

TABLE 4. *Months of available family labor of 5,195 farm families*

ITEM	MONTHS
	number
Work on farm	8.9
Work off farm	6.2
Not gainfully used	13.2
Total	28.3

Source: H. von Oppenfeld, et. al., *Farm Management, Land Use and Tenancy in the Philippines*, Central Experiment Station Bulletin 1 (College, Laguna: College of Agriculture, August, 1957), 66 p.

Lack of schooling and inability to read and write, it is reasoned further, make it impossible for farmers to keep up with research findings, changing technology, and business conditions; limit farmers to static and traditional ways; and make farmers and communities persist in their old beliefs, customs, traditions, and superstitions.

The failure of cooperative credit, marketing, and irrigation associations is deplored. It is attributed to individualism and basic lack of cooperation.

Conservatism is illustrated by the old farmer's answer to the advice of the young college-trained extension worker:

> "I have farmed and supported my family for twenty-five years; my father and grandfather did before me. Now, what do you know that I do not know?"

Other observers ascribe low farm income to the high cost and scarcity of operating capital. For the benefit of small farmers with little or no collateral, they advocate a liberal, low-cost farm credit program. Practically all improved practices, they say, involve cash outlay. The farmer, usually indebted at planting time, cannot get the inputs needed for improved methods. Hence, they maintain that availability of low-cost, readily accessible farm credit is the key to higher income.

The reader may wonder as to what extent these observations are valid; to what extent they are excuses; and to what extent they contribute to the status quo and to a pessimistic outlook. Some pertinent experiences will be discussed later in this paper.

A New Study

Contribution of the College of Agriculture

Amidst the setting described above is the College of Agriculture, established in 1909. As an educational institution, it has continuously supplied the country and even neighboring countries with agricultural leaders — administrators, teachers, and researchers.

In addition, the College has steadily led in agricultural research. Based on published papers, it accounts for about 85 per cent of the total agricultural research in the Philippines (9). The studies cover all aspects of agriculture — biological, physical, and social. They range from cultural practices of different crops to the engineering aspects of production to the methods of marketing the produce. The studies also range from the most basic, such as description of insects or counting of chromosomes to the applied, such as development of a better variety of crop or finding suitable feed rations.

Farm management studies have inquired into the causes of low farm incomes. Some remedies have been recommended, but the researchers could only go so far. They had no opportunity to help the farmers apply the recommendations or study the results afterwards.

Many questions, therefore, still need to be examined. What causes the limited impact of research findings on farms? If there is a gap between research institutions and the farmer, certainly, many agencies already exist which aim to bridge this gap. What are the problems in bringing scientific information to farmers? Are the recommendations sound? Are they practical at the farm level? Are the form and manner in which they are offered to farmers effective? Are the extension workers deficient in number or quality? Is the problem inherent with the farmers?

Workers in the Department of Agricultural Economics decided that a study along these lines was worthwhile if not long overdue. They diagnosed the *lack of technical and business know-how* among farmers as one of the principal bottlenecks in agricultural progress. They became interested in studying ways and means of effective transfer of technology to farmers. From their studies, they hoped to get deeper insights into the more dynamic aspects of farm management. Thus, they initiated in 1958 the Pilot Study in Farm Development.

Objectives

The study was specifically designed to

(1) investigate the farm management problems of incorporating on individual farms the results of present-day research;

(2) determine the effect of recommended farm practices on farmer's income; and

(3) train subject matter specialists in extension work.

The first two objectives were justifiable primarily in terms of farm management research. Unlike other studies, this one was not merely concerned with the description of a static situation or *what was.* It was also designed to initiate the process of change with the aim of knowing what was involved in the process — both difficulties and results. The third objective was a by-product of the effort to achieve the first two objectives.

Assumptions

The objectives of the study were based on four assumptions:

First, much relevant technical knowledge is not implemented by farmers. Many research findings published by experiment stations or research institutions are not translated into actual practice or used in individual farms.

Second, implementation by farmers of present-day research results will increase production and income. Often, research findings are considered impractical, returns from innovations not worth the expense. Hence, recommended practices are not adopted by farmers. There is, of course, no sense in propagating a practice that will not redound to better farming or increased productivity or income.

Third, farmers can be stimulated to accept new or recommended productive farming practices by workers who have technical competence and extension skills. Certainly, farmers cannot be expected to implement new research findings if they do not have access to such findings. In fact, beyond mere access, their interest has to be aroused; they have to be guided in the implementation, once interested.

Fourth, recommendations shown to have good results with a few local farmers will be easily adopted later by more farmers. Most farmers will wait to see how a few adventurous and progressive local farmers will fare with innovations.

As will be seen later, these four assumptions are basic to the study and provide the framework for the operating procedures and organizational set-up of the project.

Organization and Working Procedure

The Farm Development Team

To carry out the extension or development phase, a team of four technicians was organized. The four technicians were agricultural college graduates, each with a different field of specialization.

Each member was assigned to a specific village. He was primarily responsible for its development. However, he could request the other team members to help him with problems beyond his competence. Likewise, he could also be called upon to help his teammates in his own field of subject matter specialization (fig. 1).

The fields of specialization of the four technicians were:

1. *Crops* — kinds of crops, varieties, planting practices, use of fertilizer, and cultural practices;
2. *Plant pest and disease control* — diagnosis, prevention and control of plant pests and diseases;
3. *Livestock* — kinds of livestock (including poultry)[1] and choice of breeds, housing and sanitation, feeding and livestock management including diagnosis, prevention and control of livestock pests and diseases; and,
4. *Farm management* — farm business survey and analysis, record-keeping, planning and budgeting, credit financing, and marketing.

It was recognized from the beginning that farm development work means educating experienced though not well educated, and perhaps, unschooled farmers. The work, therefore, would require sound technical knowledge as well as tremendous interest and dedication. To this end, the four development technicians were carefully selected. The selection was based on their academic performance, the recommendation of their major professors and other knowledgeable persons and their obvious interest and aptitudes in working with farmers.

It may be noted further that the organizational set-up required two levels of technical competence. One was that of a general extension worker who was responsible for the general development of his assigned barrio. The other was that of a specialist in a narrower subject matter field.

The team of farm development technicians was guided by a project leader who was an agricultural economist by training. As leader, he coordinated the technicians' activities and contributed his ideas to the solution of problems. As administrator, he was responsible for developing relationships among persons and offices both within and outside the College, discussing and showing the projects to visitors and authorities, deciding on policy questions, and reporting on the progress of the project.

Two assistants were later employed to help in the follow-up and analysis of the farm records. A clerk-driver and a clerk-typist completed the supporting administrative staff of the project.

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[1] In this paper, the term *livestock* includes poultry.

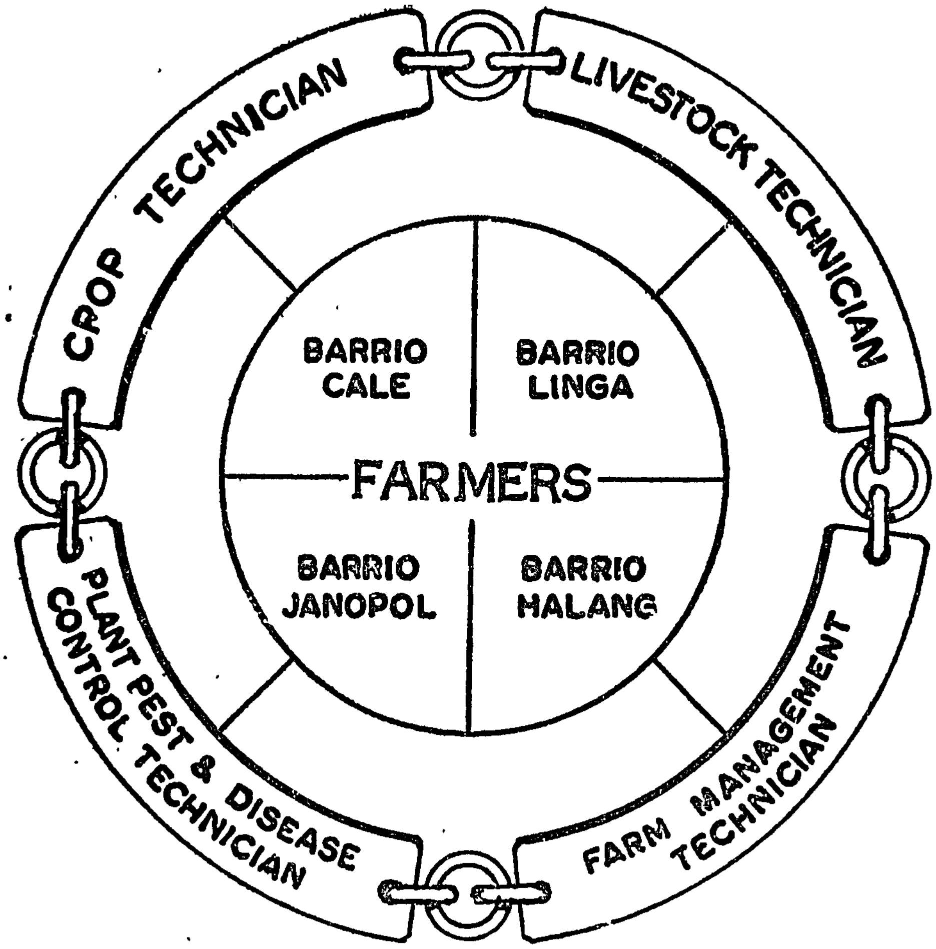

Fig. 1.—Working relationship among team members and the farmers. A worker is mainly responsible for stimulating development in his barrio. He gets "specialist service" from other members of his team, and he himself is expected to help them in return in matters regarding his own line of specialization.

Working Intensity with Farmers

There were three levels of working intensity with farmers. The first was "primary cooperators". Fundamental questions were: how much time could be devoted to individual farmers to insure the success of innovations or new projects; how many farmers could a technician serve effectively? Considering the assumption that only a few farmers would readily try innovations and that most farmers would wait to see how the first innovators fare, it was decided that each technician could work intensively with ten farmers. These ten, called primary cooperators, would be closely supervised in planning and implementing innovations in which they would be interested. The planning would take into consideration the whole farm. Farm records were to be kept and from time to time businesses were to be analyzed.

The next level of working intensity was with the other cooperators who would have small projects or specific practices to adopt or change. These farmers would be visited less frequently than the primary cooperators and generally upon their request.

All the other farmers represented the third working level. This would involve those who would attend farmer's classes, join field trips and attend field days, but who would not be eager to implement any new thing learned. With them, the technicians would maintain relationships primarily through group methods and indirectly through contacts with primary cooperators (fig. 2).

Working Relationships with Other Officers

Figure 3 outlines the relationships of the technicians to the administrative, supporting, and farmer sectors.

The farm development team had technical assistance from the various departments of the College. Extension-minded researchers and instructors took time to discuss problems met in the field. They accepted invitations to be resource persons during farmer's classes. This relationship proved mutually beneficial: the field workers continued to supply the farmers with different ideas; the College got more insight into problems in the field.

Where it was possible the team worked hand in hand with other agencies. Some pest and disease control officers of the Bureau of Plant Industry found it helpful to supply free chemicals to farmers being followed up by the farm dvelopment technicians. Technical personnel of government agencies like the Bureaus of Agricultural Extension[2] and plant Industry were invited as resource persons on some occasions. Some municipal agriculturis's encouraged farmers to visit the pilot barrios. Commercial agricultural companies participated largely in field days where they exhibited their products and even donated some agricultural supplies and equipment as prizes.

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[2] New Commission on Agricultural Productivity (CAP).

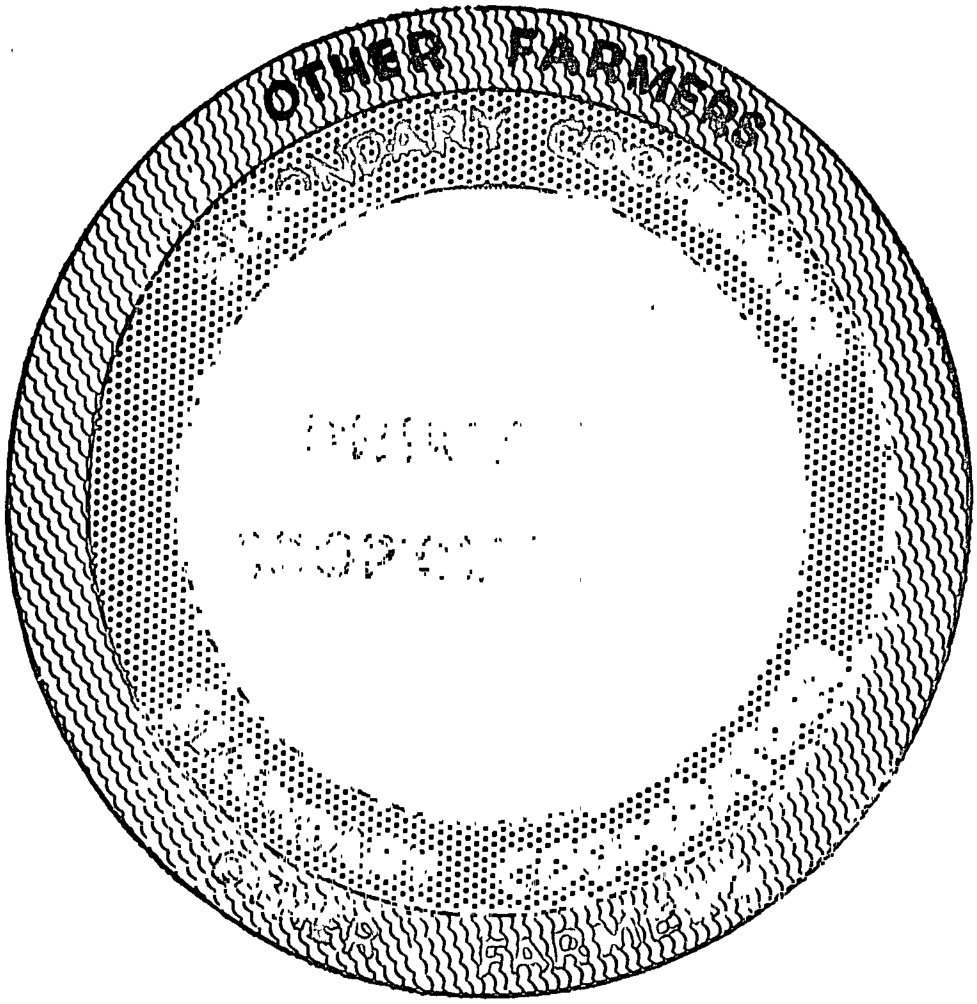


Fig. 2.—Different levels of working intensity. The primary cooperators get the most attention and are involved in most activities. A larger number of farmers, called secondary cooperators, get the next intensive attention. The largest group of farmers get involved only in group activities, e.g., farmers classes; they get the least attention in terms of individual farm visits.

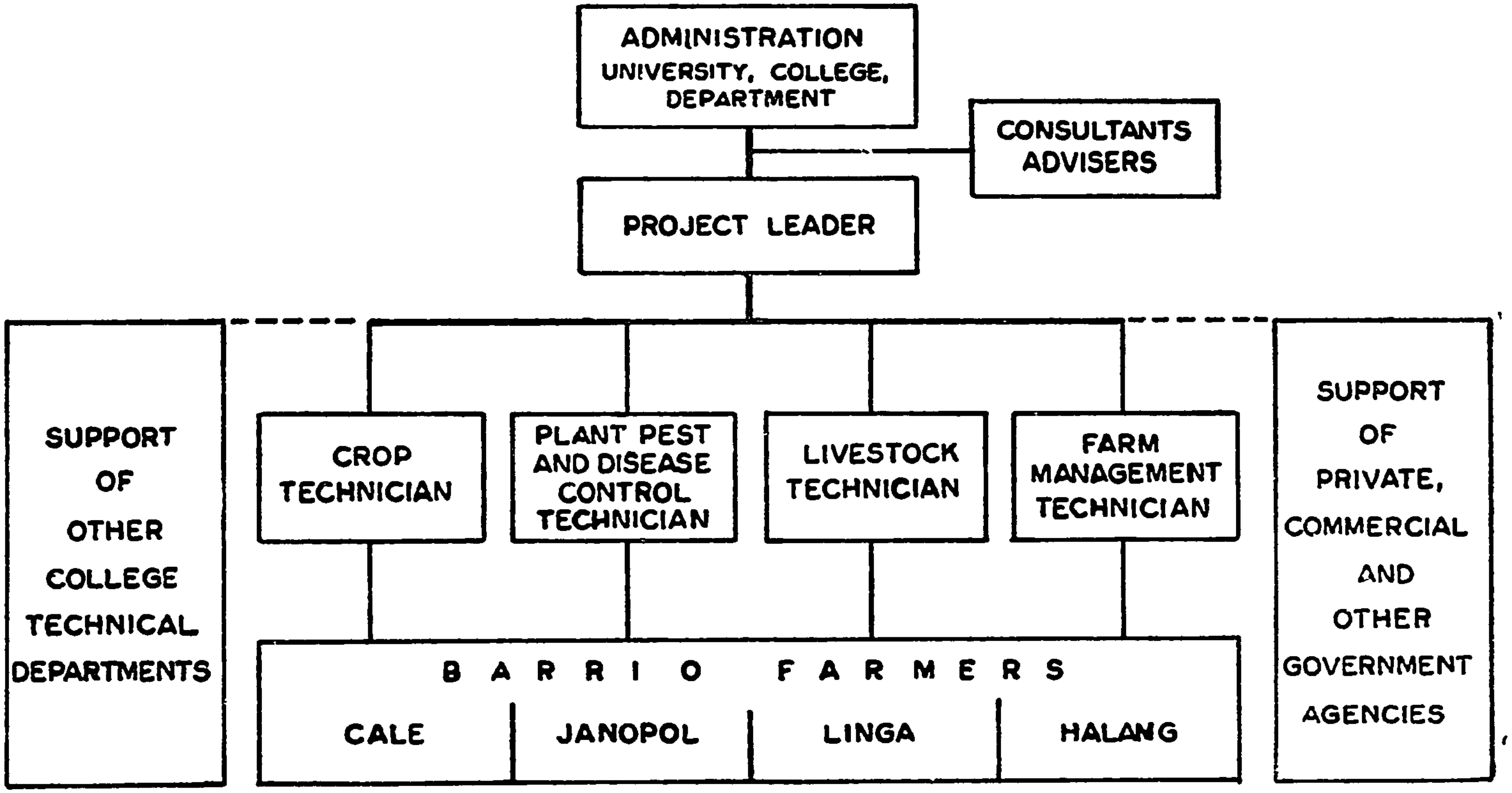

ADMINISTRATION
UNIVERSITY, COLLEGE, DEPARTMENT
CONSULTANTS ADVISERS
PROJECT LEADER
SUPPORT OF OTHER COLLEGE TECHNICAL DEPARTMENTS
CROP TECHNICIAN
PLANT PEST AND DISEASE CONTROL TECHNICIAN
LIVESTOCK TECHNICIAN
FARM MANAGEMENT TECHNICIAN
SUPPORT OF PRIVATE, COMMERCIAL AND OTHER GOVERNMENT AGENCIES
BARRIO FARMERS
CALE
JANOPOL
LINGA
HALANG

Fig. 3. — Working relationships among technicians, farmers, administrators and supporting agencies.

Activities of the Farm Development Technicians

As noted earlier, some activities of the technicians involved only a few selected farmers while others involved almost everyone in the barrio and even people from other barrios. A list of these activities would read like the various extension techniques usually reported in an extension manual. Most of the activities, however, were of the personal contact type. Group methods were next in use (7).

Selecting the Pilot Barrios

It was decided that two pilot barrios each would be selected from the province of Laguna, where the College of Agriculture is, and from the adjacent province of Batangas.

First, the municipalities were selected with the help of the Laguna and Batangas Provincial Agriculturists (provincial officers of the Bureau of Agricultural Extension).

The criteria for selection were:

(1) interest of the municipal agriculturist

(2) presence of lending institutions, government or private

(3) presence of marketing agencies

(4) nearness to College

(5) type of farming which should be typical of the province.

The municipalities selected were Biñan and Pila for Laguna province and Tanauan for Batangas province.

The barrios were selected with the help of the municipal agriculturists, some municipal officials, and other local leaders. The criteria used were:

(1) peace and order conditions

(2) type of farming which should be typical of the municipality

(3) cooperative spirit of the people

(4) attitude of barrio people towards agricultural workers

(5) presence of new facilities such as irrigation and drainage

(6) accessibility to means of transportation.

The barrios selected were Halang for Biñan, Linga for Pila, Cale and Janopol for Tanauan.

The two sets of criteria were set up to provide a certain degree of insurance against the failure of the project from one or more adverse factors. For example, it would have been wasteful to conduct the project in an area where the peace and order situation would limit the

After the experience in Janopol, the method of selecting the primary cooperators in the three other barrios was modified. The technicians tried to get acquainted with the farmers during the first meetings, on occasional visits, and during the farm and household survey. They themselves made out the list of prospective cooperators which was submitted to the local leaders for review and possible change or approval. This method proved more effective than the first.

Conducting Farm and Household Survey

"Build the program where the farmers are" is a cardinal principle in extension work. To know *where* the farmers were, a survey of farms and households was conducted. The survey, in addition, provided the technicians with the opportunity to:

(1) promote acquaintances with the farm families

(2) understand formal and informal groupings and leadership patterns

(3) learn about the amount and use of the resources of the individual farm families

(4) observe at close hand the problems of these families

(5) form early judgments on possible shifts or adjustments and

(6) help select primary cooperators.

Conducting Farmer's Field Trips

One way of showing the farmers possibilities of increased production and better farming practices was to take them out on field trips. They were invited to the College to see improved crop varieties and livestock breeds and their necessary care and attention. They were also shown some experiments.

The farmers were impressed by what they saw, but were clearly doubtful about whether these "wonderful" things would be practical on their own farms. To convince them that some of these practices could be adopted, they were taken to progressive private farms. They were shown around a hybrid corn seed farm, commercial poultry farms, and model rice farms which had been winners in the national contest.

Setting Up Local Field Research and Demonstration Lots

Applied field research and demonstration lots were set up with the help of some of the aggressive, liberal-minded farmers in the barrio. Some tried a small scale comparison of hybrid and native corn. Others compared the performance of certified seeds of recommended rice varieties with native varieties which they had been using for years. Not a few tried out new crops, one of which was the newly developed beans —

technicians' movement and demand utmost caution. However, the criteria were not too rigidly imposed. The officials consulted simply approximated which places would qualify above the minimum requirements. It can not be said, therefore, that the pilot barrios were the best in the two provinces.

Holding Farmer's Meeting and Classes

After preliminary discussions with local barrio leaders, the project personnel started meeting with the farmers. At these meetings they introduced the project, presented themselves, and discussed their objectives, operating procedures, and working relationships. In addition, these meetings served initially to identify the farmers' interests, needs and problems. They also served as a first step to stir up awareness of new farming horizons.

Later, the farmers' meetings became more like informal classes. Specific farm problems and subject matter fields were scheduled for discussion. From time to time, specialists from the technical departments of the College and from other agencies like the Bureaus of Agricultural Extension and Plant Industry were invited.

Selecting Primary Cooperators

After the first meeting in Barrio Janopol, the barrio leaders were requested to select ten farmers who would be the primary cooperators. The suggested criteria for selection were:

(1) willingness to make changes
(2) leadership in the community
(3) willingness to share ideas with other farmers
(4) good credit risk
(5) average or better ability, education, interests, etc.
(6) ambition and
(7) a farm slightly above average in size, typical in soil, productivity, and type of farming, and strategically located.

Having the local leaders select the primary cooperators proved fairly effective since these leaders knew the farmers. Some limitations could not be avoided, however. Some of the farms selected were too small. The cooperators chosen were slightly concentrated in one area rather than scattered at strategic points in the barrio (fig. 4). There was also the problem of how the local leaders used the criteria suggested. They either had a different concept of these criteria or were governed by their own idea of who the primary cooperators should be.

the "Los Baños Bush Sitao". Still others tried recommended practices on planting distance and proper application of fertilizer.

These activities were useful in three ways. First, the results guided the technicians in making recommendations to the barrios. From these results they determined modifications in the light of differences in location, soil, and climate.

Second, the farmers directly involved not only *heard* about and *saw* but actually *did* each step of the projects. They were exposed to systematized experimentation. They learned to be critical yet forward-looking in the search for something better.

Third, the farmers involved in the project or experiment, as well as those not involved, developed more confidence in the technicians' judgment and competence. The projects dimmed the image of the technicians as high-strung all-around experts with hard and fast, cut and tried formulas for improving the farms and the farmers. Rather, they were now seen as persons who wanted to work hand in hand with the farmers in looking for practical solutions to their problems.

Holding Field Days

The first field day was organized in Barrio Cale. The main purpose was to involve as many farmers in the barrio and possibly in adjoining barrios.

Preparations for the field day were started well in advance. A demonstration lot was planted to different crops. So that all the crops would be at their best during the field day, they were planted at different times according to their maturity periods which would coincide with the field day. The lot served for method demonstrations during land preparation, planting and cultivation, and for a result demonstration during the field day.

A contest on the different farm projects was organized and judging was held during the field day. Private agricultural companies were invited to exhibit their products and to acquaint the farmers with different agricultural supplies. They were also asked to donate prizes.

Other agencies interested in rural development were invited to the field day and most of their personnel who attended acted as resource persons.

The program of activities was planned with the farmers and then publicized. It included a tour of the demonstration lot with the technicians supplying information about the crops.

There were method demonstrations of important recommended practices. At an open forum the farmers asked questions about what they saw and about their own farm problems. Resource persons from the

College, as well as from other offices, answered the question and exchanged views with the farmers.

Organizing or Reactivating Associations

Associations, formal and informal, were common in the pilot barrios, but most of them were rather inactive. Only one or two significant activities were held during the year. By reactivating these associations, especially the farmers' extension clubs, the technicians found a good vehicle for their work. Farmers' meetings, classes, and field trips were usually worked out with these associations. The same was true of the field day.

Only in one barrio, Cale, was a new group organized. The technicians started a youth club to involve the young people more in farming activities.

Making Farm and Home Visits

The different activities fostered interest in and learning of new farming practices and enterprises. There was a need for intensive follow-up, however.

The technicians helped secure seeds for those who became interested in planting hybrid corn. They made sure that the corn plants were properly taken care of, fertilized, and that other cultural operations were well timed. They helped farmers who decided to start small commercial poultry or swine projects to secure good stock, set up the poultry houses or pig pens, plan and implement the feeding scheme, vaccinate the animals, and apply other good management practices.

Some projects failed when the farmers neglected one or a few crucial steps. An example was the farmer who planted bush sitao, a newly introduced type of green beans. Unlike the traditional crops of rice and corn, bush sitao requires delicate attention. It has to be fertilized right at planting or very soon after because it has only about 45 days from planting to flowering. It has to be sprayed regularly against pests and diseases. Because these two operations were not done on time, the farmer's crop of bush sitao, which could have been an unusually high income earner at that time, did not even yield enough to pay for the costly seeds.

Through intensive farm and home visits the technicians were able to reduce such failures. They were in a much better position to detect what was going wrong. In some cases, they discovered advanced symptoms of plant diseases which the farmers would not have noticed, otherwise. In other cases, the problem arose simply from the farmer's traditional practice of waiting for the trouble to pass or to accept passively the result, believing that it was "punishment from God" and so nothing could be done about it.

The contrast in performance between the hybrid and native corn in this farmer's field is dramatically self-explanatory and is much more meaningful to farmers than a similar scene in the Central Experiment Station.

The best recommendation for the protection of cucurbits against fruit flies is to wrap the fruit with old newspapers. Plastic bags are more costly and the temperature-moisture condensation factors within the bags interfer with the growth of the fruit. Chemical control is most uneconomical. Field trials with farmers, like the one on ampalaya or bitter melon help the technicians to check information and convince farmers.

Diagnosing the problem and discussing the solution right in the field with the farmer is much more accurate and more convincing than a question and answer session in the Office. Above, the patola, a trellis gourd, and the insect pests attacking it are the subject of discussion between Farmer Cooperator Mang Dama and the Crop Technician.

Gaining the Confidence of the Farmers

Farmers adopt innovations or recommendations only when they have confidence in the innovators and the innovations. Developing rapport with the farmers right after the technicians came ino the barrios was a crucial step. The Farm and Household survey was helpful here. The technicians immediately endeavored to be identified with and accepted as part of the community. It took all the other activities to demonstrated the interest and capability of the technicians, the merits or demerits of the innovations.

Continuous Search for Suitable Extension Techniques

The technicians did not have formal training in extension work: only one had a short experience with the Bureau of Agricultural Extension before he worked for his college degree. Partly because of this, they were continuously on the lookout for more and better extension techniques. In the process, they realized another important principle in extension work: *that no one extension technique is sufficient,* rather, effective extension work is a composite of many techniques, varied according to the situation.

The Problem of Free Material Aid

One principle that governed the working relationship between the technicians and the farmers was *no free material aid.* Right at the first meetings, it was emphasized that all the technicians could offer was their advice. The technicians would study the farmers' problems and discuss with them feasible solutions. They would help each other plan possible improvements. The farmers would supply whatever materials were needed to implement the planned innovations on their farms.

At first, farmers and political leaders found it difficult to understand and appreciate this philosophy. Activities of government agriculturists and extension workers have usually been associated with free material. Chemicals, sprayers, subsidized fertilizer, and even services had been given free in the belief that farmers could not afford to improve their own lot and that they must be supplied with materials for improvement before they could make changes. . Farmers had come to expect the government worker to spray their crops every season with government-owned sprayers and insecticides. Because it had been done once, the farmers expected it to be done again. Otherwise, they concluded, there was something wrong with the government workers, the politicians, or even the government!

The College, however, insisted on the principle of *no free material aid* for many reasons. First, the farm development project was an educational venture. It sought to develop in the farmers skills, knowledge, and attitudes useful in improving their farms and farming methods. This change could hardly be attained with free material aid.

Second, there is always a limit to what any agency can give free. Unbalanced relationships result because not every farmer can be benefited at all times. The few who are benefited become friends; the many who are not, are alienated.

Third, projects based on free material aid usually have not been as beneficial as expected probably because of the relative unconcern of the recipients. They do not have much at stake. An example of failure due to improper care and negligence was the death from choking of an upgraded sow given to the farmer through a swine chain distribution scheme. The sow was not confined to a pig pen but tied with a rope the usual way — around the neck. Another example was the butchering of precious breeding animals distributed primarily for the improvement of local stock.

Fourth, the farm development team wanted to impress on the farmers the idea that no practice should be followed if the investments could not be paid for by the additional income generated, and that no one can afford to "waste money" on fertilizers, pesticides, or other improved practices.

Fifth, the College had no funds for free materials. This was the only reason presented to the farmers. It was easily understood and did

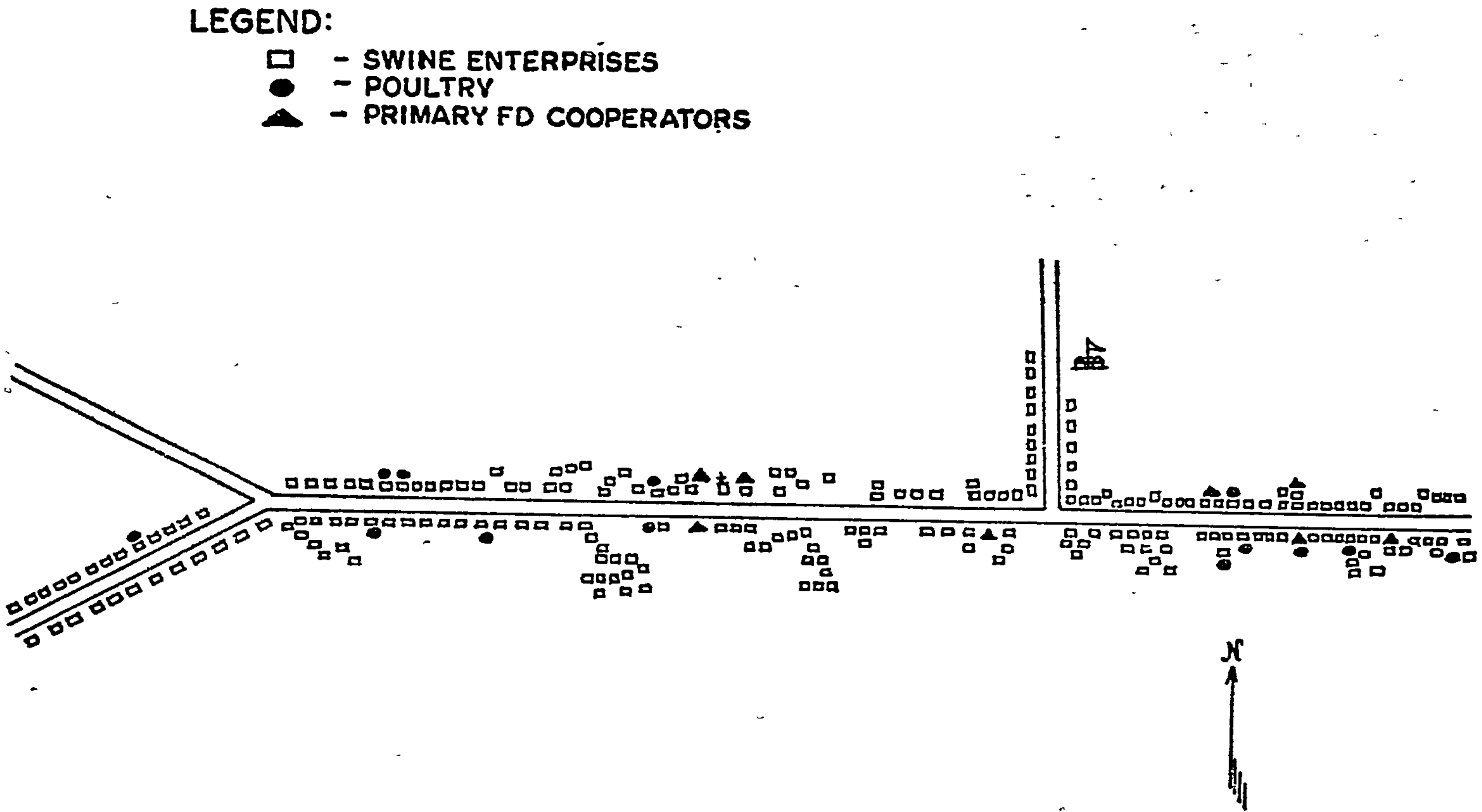


Fig. 4.—Map of Barrio Janopol showing relative location of swine and poultry projects, 1963.

not offend. It should be noted, however, that if the College had a windfall of funds, it would prefer to invest in more workers.

Two major exceptions may be noted in the stand against free material aid. One concerned research conducted on farmers' fields and small-scale demonstration lots especially designed for field days. It was recognized that in these activities the farmers would have additional inconveniences that would not directly benefit them. Different arrangements were, therefore, worked out with the farmers. In some, the College supplied the experimental materials, seeds, fertilizers, chemicals, or the like. In others, the technicians carried out the major responsibility and even contributed their own labor.

The other exception was receiving free material aid from other agencies which give them away. The College workers did not discourage their farmer cooperators from enjoying privileges given to others. On the contrary, the technicians helped workers of such agencies to carry out their programs with their respective farmer cooperators. This gave the highest benefits to all concerned. The farmers were technically guided in the proper use of the materials; the giver was aided in his work; and the farm development team had more opportunities to teach the farmers.

The Study Barrios in 1958

The four barrios selected for the study represented different types of farming areas. Janopol and Cale are upland rice barrios; Halang, lowland rice area; and Linga, lowland rice, poultry, duck and fishing area. They are located 27 to 38 kilometers (17 to 24 miles) from College (fig. 5).

Barrio Janopol

Five kilometers southwest of the town proper of Tanauan is Barrio Janopol. It is connected to the main highway by a gravel road. Passenger jeepneys run through the barrio and serve as the chief means of transportation to the town.

The population in 1958 was about 2,300 in approximately 400 households. Ninety per cent of the people were engaged in farming. Four artesian wells supplied water for drinking and other household needs. Some of the credit needs were met by the local cooperative credit union (a savings and loan association) with a capitalization of about P6,000. The children got their elementary education in the local barrio school.

Farm lands were devoted mostly to upland rice and corn. *Calamansi* (sour lemon), garlic, tomato, eggplant, and legumes were the common cash crops. Bullocks were the source of draft power. Commercial poultry projects destroyed by the war were not rehabilitated. Most families kept native chickens and a few pigs in the traditional manner,

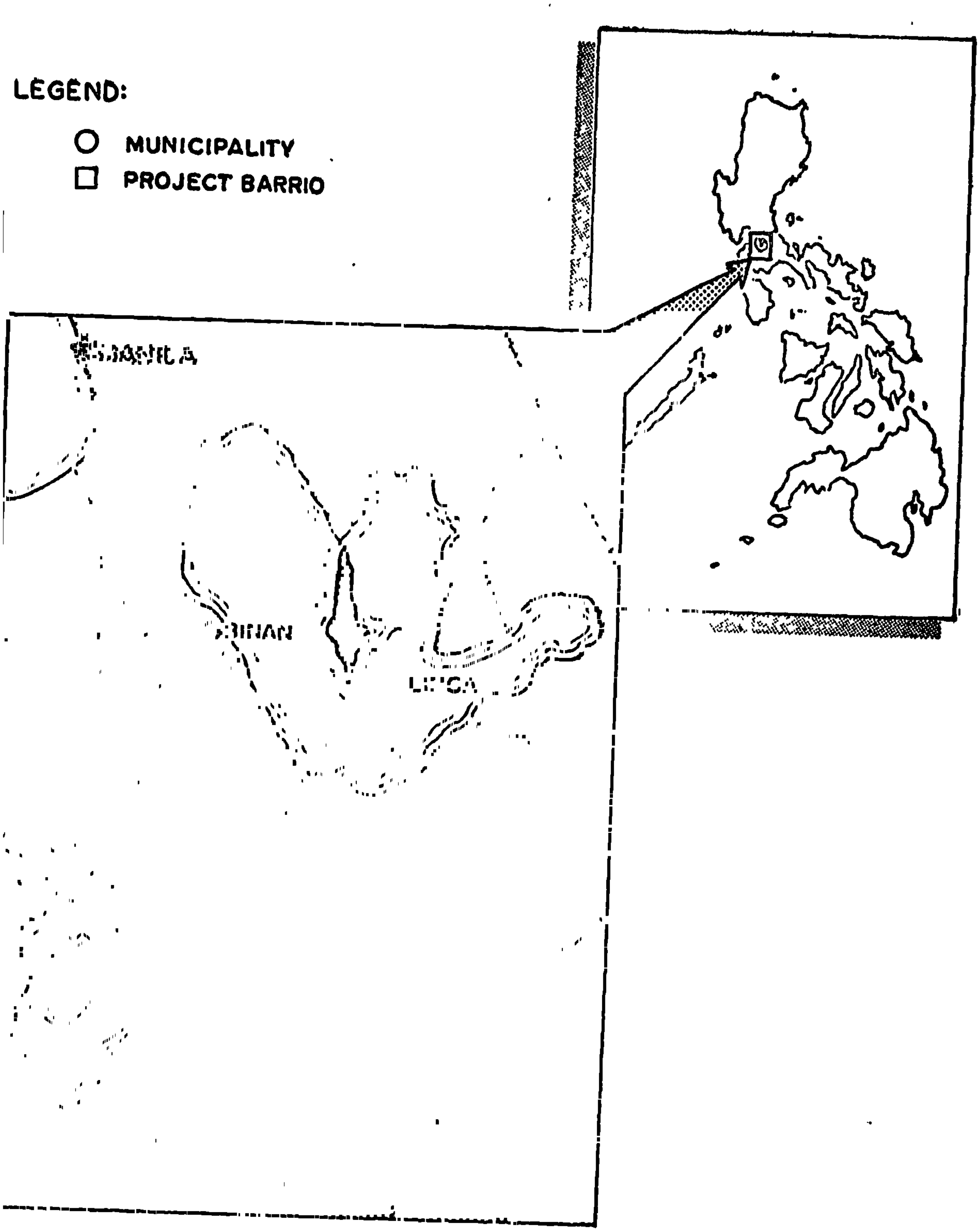


Fig. 5.— Sketch showing the location of the four pilot barrios relative to College and Manila.

without poultry houses or pig pens and partially self-supporting.

Barrio Cale

A little further down the same highway from Tanauan is a two-kilometer gravel road that leads to Barrio Cale. Passenger jeepneys are the chief means of transportation in this barrio.

The population in 1958 was about 1400 in 245 households, mostly farmers. Four artesian wells installed by the government supplied most of the water for drinking and other household needs. A few families had their own wells. The children got their elementary education in the local barrio school, temporarily housed in the chapel.

As in Janopol, most of the farm lands were devoted to rice and corn. *Patola, ampalaya, upo* (gourds of the cucurbit family), tomato, eggplant, pepper, string beans, and garlic were the common cash crops. Bullocks supplied the draft power. A few pigs and native chickens were kept in the customary manner.

Barrio Linga

Located three kilometers northwest of the town proper of Pila is Barrio Linga. It is connected to the main highway by a shell and gravel road. The main means of transportation in the barrio is the horse-drawn rig or *calesa.*

The population in 1958 was 2,695 in 462 households. Five tube wells and one artesian well supplied water for drinking and other household needs. Two schools, one primary and the other elementary, served the barrio. In addition, there were two health centers and a Roman Catholic chapel.

Most of the people were either farmers or fishermen or both. The most important crop was lowland rice. Carabaos supplied the draft power. *Calesa* horses were kept by some. Most farmers had a few pigs and native chickens. Some had commercial poultry and duck enterprises.

The fields were dependent on rain for irrigation; however, a network of irrigation canals had just been constructed as part of the Sta. Cruz-Mabacan River Project.

Barrio Halang

Thirty five kilometers northeast of the College and 35 kilometers south of Manila is the poblacion of Biñan. Three kilometers northeast of the town is Barrio Halang. It is reached from the main highway by a sand road, a community development project completed in 1956.

The population of the barrio in 1958 was 488 in 98 households. The children got their primary education from the local barrio school, temporarily housed in the chapel.

Most of the people were lowland rice farmers. In addition to their work on their farm, some found employment as laborers in the sugar plantations during peak labor seasons. Others grew corn and vegetables in the nearby highland areas. A few kept milk carabaos and sold milk in the poblacion. Not many chickens or pigs could be found in the barrio.

Most of the fields were dependent on rain for irrigation. A few landlords had small irrigation pumps for their tenants, making possible two crops a year in some fields.

Description of the Four Barrios

Rainfall

The rainfall stations nearest the pilot barrios are Tanauan for Cale and Janopol, Sta. Cruz for Linga, and Alabang for Halang (8). Barrios Cale, Janopol, and Halang belong to Type I climate which has pronounced dry and wet seasons. Barrio Linga belongs to Type II climate which has no pronounced dry season but has a pronounced maximum rain period (fig. 6).

Characteristics of the Farm Families

Detailed data on the farm families and their farming operations were collected from a sample of the population. A total of 148 farms and households were studied: 33 in Cale, 37 in Janopol, 40 in Halang, and 38 in Linga.

Educational attainment of the average farm operator and his wife was lowest in Halang (table 5). Twenty per cent of the farmers' children in Halang did not attend school in contrast to only one per cent who didn't in either Cale or Janopol. The average grade of the children who attended school was lowest in Halang and highest in Janopol. The size of households in the four barrios did not vary much.

TABLE 5. *Educational attainment and size of farm families in four pilot barrios, 1958*

ITEM	CALE	JANOPOL	HALANG	LINGA
Average grade of formal education completed				
Operator	3	3	1	5
Wife	3	2	1	3
Children (attending or have attended school)	6	7	4	6
Percentage of children who did not attend school	1	1	20	2
Average number in household	6	6	6	6

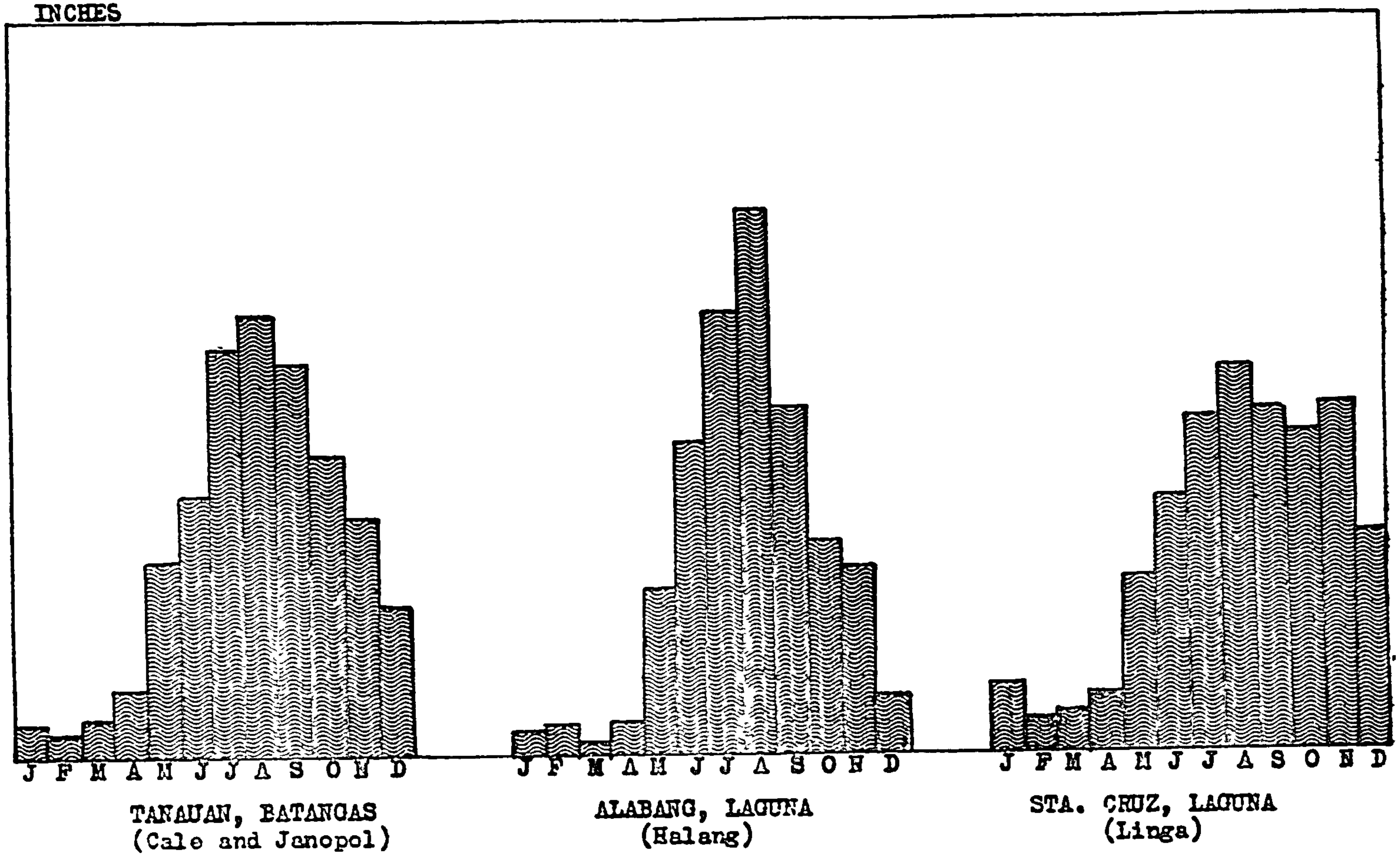


Fig. 6.—Rainfall in stations near the pilot barrios. Rainfall distribution is better in Cale and Janopol than in Halang; the difference in dry and wet seasons is very pronounced in the latter. Linga has the best distribution where there is no distinct dry season.

Tenure

Most of the farmers interviewed in the pilot barrios were tenants. In Halang, for instance, only one was a part-owner. The proportion of farm ownership was high in Cale, Linga, and Janopol (table 6).

Land Resource and Utilization

Cropland per farm was largest—3.4 hectares—in Halang. Most of the farms were planted to rice only once a year; a few had two crops of rice.

TABLE 6. *Farmers classified by tenure in four pilot barrios, 1958*

TENURE	CALE	JANOPOL	HALANG	LINGA
Number responding	33	37	40	38
		per	*cent*	
Tenant	46	27	98	55
Part-owner	27	19	2	11
Owner	27	54	—	34
Total	100	100	100	100

Linga had the smallest cropland—2.0 hectares per farm, and it was devoted to lowland rice. Farmers kept ducks and poultry.

The cropland of the upland barrios was intermediate: Cale had 2.7 and Janopol 2.9 hectares of cropland per farm. These two barrios used land intensively. One or more vegetable crops were planted between the rows of *calamansi* or sour lemon trees. Corn or vegetable crops usually followed the main crop which was rice. The effective crop area was 3.4 hectares for Cale, 5.2 for Janopol, 4.2 for Halang, and 2.1 for Linga. The percentage of intercropping was 59 for Cale, 88 for Janopol, 24 for Halang, and 5 for Linga (table 7).

Even in upland fields, rice got the biggest portion of cultivated land. Figure 7 shows a common land use pattern in the upland barrios.

TABLE 7. *Land resource and intensity of use in four pilot barrios, 1958*

ITEM	CALE	JANOPOL	HALANG	LINGA
Size of farm (ha.)				
Crop land	2.1	2.8	3.4	2.0
Total farm	2.7	2.9	3.7	2.4
Land use intensity				
Effective crop area (ha.)	3.4	5.2	4.2	2.1
Percentage of intercropping	29.0	88.0	24.0	5.0

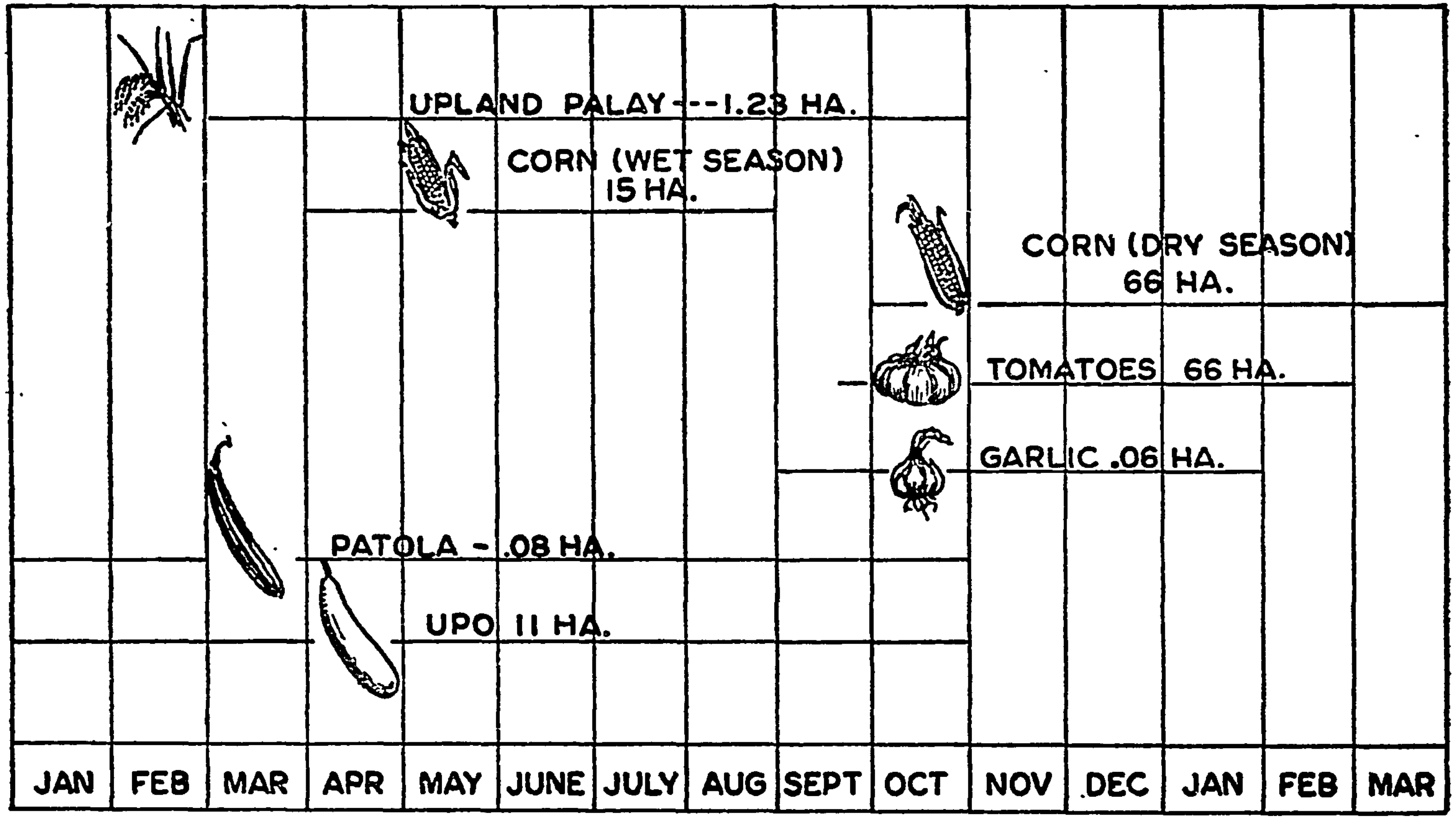


Fig. 7.—Pattern of land utilization of farmer cooperator LC-LBM, 1958-59.

Family Labor Potential and Utilization

The potentially available labor of the family ranged from 22.9 months in Cale to 32.0 months in Linga. Much of this labor was used on the farm and a little off-farm; the amount not gainfully used was about one-half (table 8).

Off-farm Work

Many Janopol farm families engaged in buying and selling in addition to farm activity. Halang farmers were usually employed as agricultural laborers during some time of the year. Those in Linga went mostly into buying and selling, fishing, [illegible] making (table 9).

Farm Investment

Farm investment was highest in Janopol, primarily because of high land value. In all barrios, land accounted for the biggest item of investment. Dwelling and work animals were the next important items. Ducks and poultry were quite significant in Linga (table 10).

TABLE 8. *Family farm labor potential and utilization in four pilot barrios, 1958*

ITEM	CALE	JANOPOL	HALANG	LINGA
			months	
Family labor potential	22.9	29.6	31.5	32.0
Used on farm				
Operator	5.5	5.6	2.8	4.5
Family members	1.9	3.2	1.7	1.3
Total	7.4	8.8	4.5	5.8
Used off-farm				
Operator	0.4	1.5	1.2	3.9
Family members	0.7	2.9	2.3	5.2
Total	1.1	4.4	3.5	9.1
Not gainfully used				
Operator	6.1	5.0	7.9	3.6
Family members	6.0	9.5	10.0	9.8
Total	12.1	14.5	17.9	13.4

TABLE 9. *Off-farm work of farm families in four pilot barrios, 1958*

NATURE OF WORK	CALE	JANOPOL	HALANG	LINGA
		number	*responding*	
Hired agricultural labor	—	—	32	2
Buying and selling	7	22	7	19
Driving passenger, calesa or jeepney	—	1	4	8
Carpentry	2	2	2	3
Dressmaking or beauty culture	5	5	1	4
Government employment	—	3	—	4
Fishing and net making	—	—	—	22
Others	—	—	1	3

TABLE 10. *Farm investment in four pilot barrios, 1958*

ITEM	CALE	JANOPOL	HALANG	LINGA
		pesos		
Land	8,836	19,702	7,282	7,359
Dwelling	1,054	1,513	416	086
Other buildings	6	35	22	436
Work animals	340	373	584	479
Other animals	103	205	52	507
Tools and equipment	120	73	100	119
Feeds and supplies	75	59	39	24
Total	10,534	21,960	8,495	9,910

Labor Requirements and Returns of Crops

Corn had the lowest labor requirement; it had also the lowest income potential. Lowland rice normally has a higher labor requirement and a higher income potential than upland rice. However, there was drought during the study year and the lowland rice crop suffered more than did the upland rice crop. This reduced the income per hectare of the two crops to about the same level.

Some crops with labor requirements similar to those of rice gave much higher returns. Some crops which had higher returns had high labor requirements (fig. 8).

The information obtained immediately suggested possible changes in the farm organization. In upland areas, where rice production would not be any more advantageous and where products can easily be transported to market, production of high income crops like tomatoes, garlic, and various vegetables may be increased.

Gross Farm Receipts

The levels of farming and living in the four pilot barrios in 1958 were indicated by the amount of gross receipts and other measures of returns. Janopol farmers had the highest crop sales of ₱875. Cale followed with ₱386 and Halang, ₱171. Linga had ₱137 which was the lowest.

The high subsistence orientation of Halang rice farmers was indicated by the value of products consumed at home which was ₱274 against their cash sales of ₱207. The ratio of products consumed at home to cash sales was ₱358/₱592 in Cale, ₱386/₱1,115 in Janopol, and ₱347/₱1,753 in Linga (table 11).

Farm Expenses

Linga had the highest cash expenses of ₱1,059 primarily because of the feed cost for livestock and poultry enterprises. Janopol and Cale had ₱352 and ₱236, respectively; fertilizer was the most important single factor, costing ₱209 in Janopol and ₱134 in Cale.

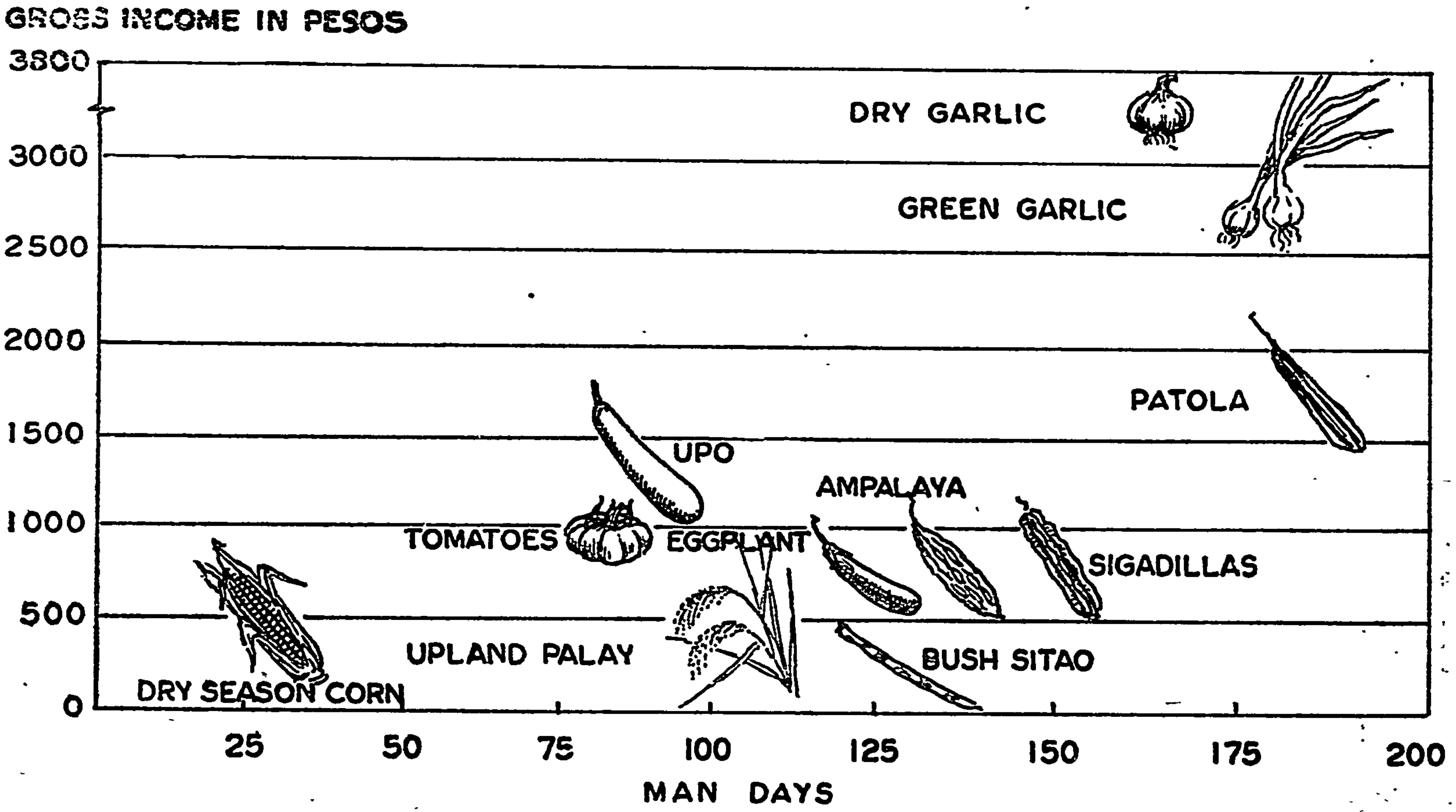


Fig. 8.—Income potential and labor requirement of some crops, Cale and Janopol, 1958-60.

TABLE 11. *Gross farm receipts in four pilot barrios, 1958*

ITEM OF RECEIPT	CALE	JANOPOL	HALANG	LINGA
		pesos		
Crop sales	386	857	171	137
Livestock and livestock sales	153	183	36	1,598
Tools and equipment sales	37	41	—	—
Miscellaneous	16	34	—	18
Total cash receipts	592	1,115	207	1,753
		pesos		
Share in kind for services	150	117	157	76
Crops to creditor	—	1	183	13
Farm products used at home	358	386	247	253
Increase in inventory	—	—	—	5
Total non-cash receipts	508	504	587	347
Total operator's farm receipts	1,100	1,619	794	2,100
Value of crops to landlord	111	157	568	258
Total farm receipts	1,211	1,776	1,362	2,358

With little variation among the barrios, the important non-cash items were shares in kind for services and unpaid family labor (table 12).

TABLE 12. *Farm expenses in four pilot barrios, 1958*

ITEM OF EXPENSE	CALE	JANOPOL	HALANG	LINGA
Cash expense		*pesos*		
Livestock bought	52	92	8	57
Tools and equipment bought	a/	2	—	53
Hired man labor	39	33	96	82
Hired animal labor	11	18	2	7
Fertilizer and other cash expenses	134	207	74	860
Total cash expenses	236	352	180	1,059
Non-Cash expense		*pesos*		
Shares in kind for services	150	117	157	76
Unpaid family labor	117	221	81	92
Decreases in inventory	162	140	126	—
Total non-cash expenses	429	478	367	168
Total farm expenses	665	830	547	1,227

a Less than one peso.

Measures of Net Returns

Four adapted measures of net returns were used in analyzing the farm business. These measures were also used in the subsequent analyses of survey data and the individual performance of cooperators during the study year.

Operator's net farm earnings. This measure is obtained by subtracting the total farm expenses from the total farm receipts. (The items included in each category were given in the previous sections.) It represents the returns to the operator's own labor and farm capital.

Linga had the highest operator net farm earnings of P873, followed closely by Janopol with P789. Cale and Halang had P435 and P247, respectively.

Operator's farm labor earnings. This measure is computed by subtracting the interest on average capital (here at six per cent) from the operator's net farm earnings. It represents the returns to the operator's labor and management.

When this measure was computed, Janopol farmers got negative earnings because most of them owned the land they farmed. Moreover, land values in Janopol were very high, averaging P6,817 per hectare.

Family farm labor earnings. This measure is obtained by adding the unpaid family labor to the operator's farm labor earnings. It represents the returns to the farm family's labor and management functions. The high land values in Janopol were reflected in the negative earnings.

Family income from all sources. This measure represents the returns to family-furnished capital, labor, and management, in addition to income from off-farm sources. The amount is available for family living expenses, farm expenses, savings and reinvestment.

Adding back the earlier charge for the interest on average capital placed the Janopol farm families on the level of the Linga families. The family income was P1,743 for Janopol, P1,779 for Linga, P733 for Cale, and P541 for Halang (table 13).

TABLE 13. *Farm and nonfarm income of farm families in four pilot barrios, 1958*

ITEM	CALE	JANOPOL	HALANG	LINGA
			pesos	
Total farm receipts	1,100	1,619	794	2,100
Less total farm expenses	665	830	549	1,227
Operator net farm earnings	435	789	245	873
Less interest on capital at 6%	427	1,026	104	324
Operator farm labor earnings	8	—237	141	549
Plus value of unpaid family labor	117	221	84	92
Family farm labor earnings	125	—16	225	641
Plus all other income	608	1,759	316	1,138
Family income from all sources	733	1,743	541	1,779

Market Outlets

Most farmers sold their products outside their respective barrios but within the municipality, usually in the town markets. Linga was exceptional in that 93 per cent of the farmers interviewed sold within the barrio to wholesalers who bought poultry and/or poultry products on contract basis. Although most farmers in the other barrios also sold to wholesalers, the transaction was done in the town market (table 14).

TABLE 14. *Market outlets in four pilot barrios, 1958*

ITEM	CALE	JANOPOL	HALANG	LINGA
Farmers reporting	67	125	22	47
		per	*cent*	
Place of usual sale				
Within the barrio	27	4	23	93
Within the municipality	67	67	44	3
Outside the municipality	6	29	33	4
Total	100	100	100	100
Type of buyer				
Wholesaler	72	50	38	78
Retailer	25	46	33	—
Merchant	—	—	7	16
Landlord	—	—	11	—
Agent or middleman	3	4	11	6
Total	100	100	100	100

Credit

The number of borrowers as well as the amount borrowed was highest among the Janopol farmers. Of the 37 farmers interviewed, 89 per cent used credit which averaged ₱2,398.

Cale had the next highest number of users of credit. Of the 33 farmers interviewed, 58 per cent used credit averaging ₱876.

Halang and Linga had few credit users and a low average of amount borrowed (table 15).

TABLE 15. *Use of credit in four pilot barrios, 1958*

ITEM	CALE	JANOPOL	HALANG	LINGA
Farmers interviewed	33	37	40	38
Farmers reporting use of credit	19	33	20	12
Percentage of farmers using credit	58	89	50	32
Average size of credit	₱876	₱2,398	₱156	₱173

Lending agencies such as the Farmers' Cooperative Marketing Associations and banks were the most common sources of credit in Cale, Janopol, and Linga. In Halang, the landlord was the main source reported by 90 per cent of the farmers interviewed (table 16).

TABLE 16. *Source of credit in four pilot barrios, 1958*

SOURCE OF CREDIT	CALE	JANOPOL	HALANG	LINGA
Private banks	68	58	—	17
Philippine National Bank and Rural Banks	—	15	—	25
Farmers' Cooperative Marketing Association	—	6	5	25
Landlord	6	3	80	8
Relatives	26	18	10	25
Other private lenders	—	—	5	—
Total	100	100	100	100

Credit was used for purposes other than farm production. Subsistence and real estate were next in importance to production in Cale. Real estate ranked higher than production in Janopol. Subsistence was much higher than production in Halang. Subsistence and commercial purposes were next in importance to production in Linga (table 17).

TABLE 17. *Purposes for credit in four pilot barrios, 1958*

ITEM	CALE	JANOPOL	HALANG	LINGA
Number of responses	21	39	22	15
		percentage of	*responses*	
Production	34	28	25	47
Subsistence	17	5	75	20
Emergency	4	8	—	13
Real estate	22	29	—	—
Commercial	9	14	—	20
Educational	13	3	—	—
Marriage	1	3	—	—
Total	100	100	100	100

Agencies Helping Farmers

Different barrios received different kinds of help from government agencies. All farmers interviewed in Halang and 4 out of 38 in Linga had contacts with various government workers.

The most common reported contact was with the municipal agriculturist; in Halang, however, contact with the community development worker was the most common (table 18).

TABLE 18. *Contact with agricultural improvement government agencies in four pilot barrios, 1958*

ITEM	CALE	JANOPOL	HALANG	LINGA
Farmers interviewed	33	37	40	38
Farmers reporting contact	5	16	40	4
Percentage of farmers reporting contact	15	43	100	11
Number of responses	6	19	53	4
		percentage	*of responses*	
Municipal agriculturist	67	79	45	100
Home demonstrator	17	5	—	—
Community development officer	16	—	51	—
Pest and disease control inspector	—	16	—	—
Agricultural tenancy commission	1	1	4	—

RECOMMENDATIONS TO FARMERS AND RESULTS

Nature of Recommendations

Intensive work was carried on in the study barrios in 1958-1959 and 1959-1960. In the third year, 1960-1961, visits to the barrios were gradually reduced preparatory to a total pull-out later that year.

During the period of intensive work in the barrios, the technicians gave out recommendations that may be grouped into two: the general and the specific.

General Recommendations

Recommendations to farmers considered their respective farm situations, problems, opportunities, and personal attributes. Some farmers needed major changes in many of their practices; others who were already practicing progressive methods needed only additional refinements in one or a few aspects of their enterprises. Most farmers were advised to take on some other enterprises.

The recommendations fell into four groups:

1. Expanding the scale of the most profitable existing enterprise(s), no new practices;
2. Improving practices in existing enterprises;
3. Introducing new enterprises; and
4. Any combination of the above.

Expanding scale of most profitable existing enterprises. Some farmers had a number of enterprises with varying profitability potentials. For various reasons, much of the farm resources were devoted to economically less profitable crops. In some upland areas, for example, it would have been better to grow more of the commercial crops, like vegetables, instead of rice or corn. Although it was dificult to make the farmers forego the production of rice and corn, some realized the advantages of reducing the area for these crops and growing more of the others. In these changes, difficulties in terms of technical knowledge were slight because the farmers were already acquainted with the crops involved.

Improving practices in existing enterprises. Many practices could not be easily changed. Some were the best for the farmers' respective areas and had been practiced over the years. The technicians chose the ones that obviously needed changing or improvement. They made recommendations regarding certified seeds, the right kind and amount of fertilizer, and chemicals for pest and disease control. The rate of acceptance or adoption of the recommendations was fast when they were easy to try because of the relatively little change from the former practice, minimum need for additional cash outlay or other reasons discussed in detail in later sections.

Introducing new enterprises. All barrios had some need for incorporating new enterprises but the farmers did not readily accept the idea. The recommendations had to be made clear and the farmers' doubts had to be overcome. The differences in physical and economic environment among barrios influenced the range of alternative enterprises.

Any combination of the three categories. In many cases recommendations to the farmers combined any of the three groups. The secon group, improving practices, was often combined with group 1 and ver often with group 3. For instance, almost all the recommended practice for improvement had to be "introduced" to the farmers.

Specific Recommendations

Below is a list of the specific practices included in the groups:

I. Crop production

1. New crops and varieties
2. Asexual crop propagation
3. Fertilization
4. Crop rotation
5. Seed selection
6. Seed preservation and storage
7. Germination test
8. Weeding and cultivation
9. Diversification of enterprises
10. Thorough land preparation
11. Soil testing
12. Manuring
13. Compost pit
14. Cultural and performance trial

II. Pest and disease control

15. Use of insecticides
16. Use of fungicides and antibiotics
17. Control of crop storage pest
18. Elementary diagnosis
19. Mechanical control of pests and diseases
20. Precautions in use of agricultural chemicals
21. Spraying schedule

III. Livestock and poultry

22. Hog housing
23. Improved stock
24. Artificial insemination
25. Natural selection
26. Immunization
27. Deworming
28. Improved feeding
29. Complete rations
30. Surgical castration
31. Continuous culling of poultry
32. Sanitation
33. Elementary diagnosis
34. Manure and compost pit

IV. Economic and farm management practices

35. Farm planning and enterprise adjustments
36. Crop timing
37. Cooperative marketing
38. Grading
39. Merchandising
40. Record keeping
41. Commercial credit
42. Work simplification
43. Combination of enterprises
44. Buying and selling

This list does not include the more specific recommendations given to farmers. The specific new crop or variety varied from farm to farm. An established crop enterprise in some barrios was considered new in others.

The technicians considered not only the number of practices but also the quality of these practices. Some practices, like the use of fertilizers or insecticides, were already being followed. Changes only in the kind, amount, method, and time of application had to be made.

The quality of enterprises was also studied. Some farmers who had only one or two well managed and, therefore, profitable enterprises were better off than others with more enterprises but which were not managed as well.

Illustrations of Experiences with Individual Enterprises

The effect of the nature of the recommendation on the rate of acceptance or adoption has been pointed out earlier. It may be made clearer with a discussion of experiences with individual enterprises.

Lowland Rice

National government agencies had been vigorously promoting improvements in agricultural production, particularly of rice, even before the start of the pilot study in 1958. However, rice farmers in the lowland pilot barrios, Halang and Linga, had little awareness of the recommendations. No one used certified seeds of recommended rice varieties or planted rice in straight rows. Neither did they use a mechanical rotary weeder, or control pests and diseases with chemicals.

Recommended rice varieties. Two farmers in Halang planted a cavan each of Intan, one of the recommended rice varieties, in the May-June planting season of 1959. One of them got good results (table 19), but the other had some excuses for his poor crop. Nevertheless, the good results led the landlords in the area to buy certified seeds of Intan and Tjeremas for planting by their tenants in the next season. About 90 per cent of the farmers planted these two recommended varieties in that season. Unfortunately, three successive typhoons damaged these early-maturing varieties. The landlords and the tenants then went back to their old variety, Wagwag, which, being late-maturing, had fared better.

The experience in Linga was more favorable than that in Halang. Three farmers planted five cavans of Intan, and three, five cavans of Tjeremas.

At the time of trial planting, many farmers feared that the trial plants would all be eaten by insect pests, birds, and rats inasmuch as all the other areas were planted to Wagwag, the commonly grown, late-maturing variety. The results, however, proved that the recommended early-maturing varieties were better yielders.

TABLE 19. *Area planted and yield per hectare of three rice varieties in Halang and Linga, 1959-1960*

FARMER NUMBER	HECTARES PLANTED Wagwag	 Intan	 Tjeremas	CAVANS YIELD/HECTARE Wagwag	 Intan	 Tjeremas
			Barrio Halang			
1	1.0	2.5	—	46.8	38.6	—
2	1.3	4.7	—	33.8	47.0	—
Total/ave.	2.3	7.2	—	38.8	44.0	—
			Barrio Linga			
1	0.6	2.1	—	67.2	85.1	—
2	2.6	—	2.6	64.1	—	50.7
3	—	—	0.7	23.7	—	53.2
4	3.0	0.3	—	26.8	82.8	—
5	1.0	0.3	—	33.4	52.2	—
6	—	—	1.5	—	—	93.9
7	1.9	—	—	72.4	—	—
8	4.5	—	—	88.9	—	—
9	1.0	—	—	65.1	—	—
10	2.7	—	—	69.2	—	—
Total/average				42.8	79.8	65.6

The good results of the trial plantings led many farmers to plant the recommended varieties. In the trial plantings they had to exchange a part of their harvest with the ordinary varieties of the other farmers so that the latter could have seeds of the new varieties. It may be safe to say that the Linga farmers have accepted the use of recommended rice varieties.

Seedbed and seedlings. For the rainy season rice crop, the farmers sowed very thickly in the seedbed. This resulted in overcrowding and in weak seedlings. Technicians told the farmers of the need for healthy seedlings to start a good crop. They advised the farmers to use larger seeding areas and to sow the seeds more thinly. In addition, they recommended more care for the seedlings, use of manure or fertilizer, and spraying against pests and diseases.

Another recommendation concerned the age at which seedlings should be transplanted. Many farmers transplanted seedlings 45 days old, thus disturbing the initial growth. The farmers easily understood the recommendation. They transplanted the seedlings at the recommended age of about one month. In some cases, however, irrigation was not controlled, and the farmers had difficulty in forecasting or setting accurately their planting dates.

The relative ease with which these recommendations were adopted could be attributed to (1) the short time needed to see results, and (2) the involvement of only a small area. The growth of seedlings may be observed in a month or so. However, additional expenditures will be relatively small since the seedbed areas are smaller than the fields.

Spacing, straight-row planting, and use of mechanical weeders. The usual spacing of rice plants in Halang and Linga was from 10 to 15 centimeters. The technicians recommended wider spacing of about 30 centimeters. Many farmers adopted this practice when they saw the results of a local field trial (table 20).

TABLE 20. *Results of a local field trial on spacing lowland rice in Halang, October 1958-March 1959*

ITEM	USUAL PRACTICE	RECOMMENDED PRACTICE
Area planted (hectares)	.46	.16
Distance of planting (cm)	15 × 15	30 × 30
Rate of fertilization (kg. N/ha)[a]	30	30
Yield per hectare (cavans)	39.6	62.5

[a] Fertilizer used was ammonium sulfate (20-0-0).

The recommendation to plant in straight rows, however, met some opposition. The only justification for it was to enable the use of mechanical rotary weeders.

The innovation was accepted slowly primarily because of (1) the cost of weeders and (2) the absence of well controlled irrigation water. In Linga where some farmers had already bought their own weeders, planting in straight rows was gradually practiced.

Fertilizers. Farmers usually applied fertilizers at the rate of one to two bags per hectare and only on portions of their farms. Recommendations for higher rates of application met two main setbacks.

The first was the unreliability of experimental results. It has long been observed that many Philippine rice varieties either are not clearly responsive to fertilizers or can not stand heavy fertilization (12). The local field trial, for example, showed that in one field, 60 kilograms nitrogen and 45 kilograms potassium gave the best yield. In another field, 30 kilograms nitrogen gave the best (table 21).

TABLE 21. *Results of fertilizer field trials on lowland rice in Linga, October 1958-March 1959*

TREATMENT			YIELD PER HECTARE	
N	*P*	*K*	Field I	Field II
	kilograms		*cavans*	
0	0	0	58.6	126.8
30	0	0	63.4	141.9
30	45	45	79.7	130.4
60	45	0	82.7	120.7
60	0	45	76.7	122.6
0	45	45	67.0	112.3
60	45	45	70.6	136.5

The second difficulty was the dependence on government subsidized fertilizers. Landlords, as well as owner-operators, would not buy fertilizers from regular commercial channels. They mistook the regular

Amazed? Yes, and more! Mang Bino must also be proud because this is the first time he got this stand of rice Thanks to clean culture and proper application of fertilizers.

commercial prices for "black market prices." Nevertheless, they understood that commercial suppliers had to ask for higher prices because their supplies were not subsidized by the government. But since the government could not provide the needed fertilizer at reduced prices, farmers who depended only on the subsidized supply used *little or no fertilizer* at all.

It would be inaccurate to conclude, therefore, that the change from ammonium sulfate (N) to complete fertilizer (NPK) was made because it had been recommended or because the farmers realized its advantages; it was probably due to the fact that only complete fertilizers were distributed by the government.

A brighter prospect of fertilizer application lay in the use of manures and compost Chicken dung and swine manure have been accepted in Linga and the upland barrios.

Chemical control of pests and diseases. At the start of the project, the farmers of Ilalang and Linga were not using chemicals to control pests and diseases. Farmers, however, readily accepted the recommendation to use chemicals after they had seen how rice blast, armyworms, and leafhoppers in some rice seedbeds were effectively controlled by chemicals like Parzate, Endrin, Resitox, and other DDT solutions. The ready acceptance of the recommendations may be due to:

1. clear effectiveness of the measure
2. availability of chemicals in local stores, and
3. relatively small expenditures.

Upland Rice

The upland rice farmers in Cale and Janopol had more progressive farming methods and practices than their lowland counterparts. They used more fertilizers and were in touch with private commercial suppliers. However, they still had something to learn from the Farm Development technicians.

Varieties. No one in the two barrios had ever grown a recommended upland rice variety. To determine which of the eight recommended upland rice varieties would do well in the area, a local field trial was conducted in cooperation with the Department of Soils of the UP College of Agriculture. The varieties were planted in replicated lots beside the common variety grown by farmers. The field trial showed that only Kinandang Puti and Azucena were better than the local variety, Inabaca (table 22).

TABLE 22. *Yield and maturity period of different upland rice varieties in local field trial in Janopol June-October 1958*

VARIETY	YIELD PER HECTARE	MATURITY PERIOD
	cavans	*days*
Kinandang Puti	71.0	116
Azucena	65.3	128
Inabaca	58.3	125
Palawan	54.8	131
Mangarez	51.4	131
Magsanaya	48.5	123
Nagdami	44.3	133
Pinulot	42.0	131
Fortuna	38.8	132

The season following the field trial, one farmer in Janopol planted one cavan of Azucena. One farmer in Cale planted one-half cavan of the same variety. The two farmers started what may roughly be called a "certified rice seed chain". Other farmers exchanged their ordinary rice varieties with seed materials of Azucena from these two. The process was repeated by other farmers in the following season. Although the technicians were happy over this development, they were also concerned with the quality of seeds, and so they continued to interest the farmers in buying the real certified seeds.

In June 1960, more new seeds were ordered from the Bureau of Plant Industry, one of the two government offices primarily responsible for producing certified seeds. For various reasons, the farmers could not get their order even after several follow-ups in the Bureau. This made them resort to the second best alternative — exchanging their ordinary rice with seeds harvested from the earlier crops of the recommended rice variety. In Cale, nine farmers were able to plant a total of 4.5 cavans through this procedure. Many others had to continue with their old variety.

It may be safely concluded, therefore, that in the upland barrios of Cale and Janopol, the use of recommended upland rice varieties has been generally accepted. The major problem, however, has been the *unavailability* of certified seeds.

Fertilizers. Upland rice farmers had been applying fertilizers at the rate of two to three bags or 18 to 27 kilograms of nitrogen per hectare. This was somewhat higher than the rate in the lowland pilot barrios.

Local field trials indicated positive response and marginal returns at higher rates of application (table 23).

TABLE 23. *Results of fertilizer field trials on upland rice in Cale and Janopol, June 1958*

TREATMENT N	 P	 K	YIELD PER HECTARE CALE	 JANOPOL
	kilograms			*cavans*
30	—	—	73	60
30	45	—	77	67
60	—	—	81	72
60	45	—	82	73
60	—	45	96	80
90	—	—	95	a
90	45	—	94	72
90	45	45	91	79

a The cooperator did not heed the request of the technicians to harvest the crops under the latter's supervision in order to measure the results.

Technicians recommended a rate of from four to six bags per hectare of more organic fertilizers like chicken dung and compost.

An increased use of organic fertilizer and higher rates of commercial fertilizer application were gradually accepted, although not always at the recommended level.

Chemical control of pests and diseases. Pest and disease control by chemicals had already been practiced by some farmers in the upland pilot barrios on their vegetable crops, but not on rice. There were few pests and diseases on upland rice. The only major disaster occurred when rice blast became prevalent not only in the pilot barrios, but also in the neighboring ones. Spraying with Parzate was recommended. It was not difficult to convince the farmers to do this because they were familiar with the practice on their vegetables.

Corn

Recommendations on corn included kind of seeds, spacing between plants, rate of fertilizer applications, and control of pests and diseases.

Hybrid corn. The use of hybrid corn seeds is the most striking recommendation in corn growing. Coupled with improved cultural management, hybrid corn seeds easily produce more than 50 cavans per hectare or four times the national average of 12 cavans per hectare.

Before the pilot study, no farmer in the upland barrios, Cale and Janopol, had planted hybrid corn. In the wet season of June to October, 1958, five farmers in Cale and eight farmers in Janopol were convinced to try hybrid corn on a total of 1.5 hectares. The results were very good (table 24).

TABLE 24. *Area planted and yield of hybrid and native corn in Cale and Janopol, June-October 1958*

FARMER NUMBER	HECTARES PLANTED Hybrid	HECTARES PLANTED Native	CAVANS YIELD/HECTARE Hybrid	CAVANS YIELD/HECTARE Native
		Barrio Cale		
1	0.1	—	44.8	—
2	0.1	0.2	66.4	19.0
3	0.1	0.4	63.4	21.2
4	0.3	—	39.0	—
5	0.2	—	53.3	—
6	—	0.5	—	29.9
7	—	0.5	—	19.0
Total/average	0.8	1.6	49.8	23.0
		Barrio Janopol		
1	0.1	—	53.8	—
2	0.2	—	52.3	—
3	0.2	—	43.2	—
4	0.3	—	46.1	—
5	0.1	0.3	49.9	32.2
6	0.2	—	50.6	—
7	0.3	—	46.1	—
8	0.1	—	47.1	—
9	—	0.6	—	39.2
Total/average	1.5	.9	48.0	36.9

The clear advantages of using hybrid corn seed encouraged more families in planting it. In the next season, although the yields of hybrid corn were very low because of lack of water during the growing period, they were still much higher than those of the native (table 25).

TABLE 25. *Area planted and yield of hybrid and native corn in Cale and Janopol, October 1958-March 1959*

FARMER NUMBER	HECTARES PLANTED Hybrid	HECTARES PLANTED Native	CAVANS YIELD/HECTARE Hybrid	CAVANS YIELD/HECTARE Native
		Barrio Cale		
1	0.57	—	10.5	—
2	0.74	—	14.0	—
3	—	0.33	11.6	7.0
4	0.86	0.25	11.6	3.2
5	0.45	0.30	24.4	15.0
6	0.38	0.15	23.6	8.9
7	0.12	—	12.5	—
8	0.57	—	9.6	—
9	0.45	—	11.1	—
10	—	0.40	—	2.5
Total/average	4.14	1.43	14.1	6.9
		Barrio Janopol		
1	0.37	—	5.4	—
2	0.12	0.60	10.8	5.6
3	—	0.30	—	9.3
4	0.40	0.20	18.2	6.0
5	0.70	0.40	30.0	3.7
6	0.45	0.42	20.0	5.4
7	0.50	—	23.6	—
8	0.45	0.33	20.4	7.5
9	0.60	—	17.5	—
10	0.35	0.20	16.0	5.0
11	0.39	0.30	16.1	6.6
12	0.50	0.30	20.0	7.3
13	0.30	0.50	20.0	5.0
14	0.20	0.20	12.5	2.5
Total/average	5.33	3.75	19.2	5.8

In spite of its greater yields, hybrid corn did not become as popular as Azucena, the recommended upland rice variety, for various reasons.

The most commonly cited reason was the toughness of the stalks. Since corn stalks are fed to work animals during the dry season, the problem seemed overwhelming at first. However, some farmers who tried hybrid corn seed said that their work animals ate the tough stalks just the same. They even reasoned that the toughness was due to the generally larger stalks. The fact that more feed could be gotten from hybrid corn could be used to advantage. Toughness of the stalk may in the meantime be dismissed as "bias at first sight", but animal nutritionists and plant breeders should study the problem.

The yield potential of hybrid corn decreases with each generation; only second generations give fairly satisfactory yields. An important problem, therefore, was the reluctance of farmers to spend for seeds at planting time. It was difficult for them to part with a few pesos, knowing that they could plant their fields without expense by using their own seeds. They could not see the big difference in returns after investing a little in seeds. This is, of course, understandable; it is more difficult to visualize concepts than tangible objects.

The unreliable supply of high-quality seeds aggravated the reluctance of farmers to buy them. Both government agencies and private traders hesitated to carry hybrid corn seeds because without refrigeration, the seeds easily lose their viability. Consequently, many interested farmers had to content themselves with second-generation seeds; still many more went back to the old native varieties.

Distancing of plants. Farmers usually planted corn 50 x 50 centimeters apart. A local field trial was conducted to confirm general recommendations from College. The results showed that wider distancing was favorable (table 26).

TABLE 26. *Results of local field trial on distancing of corn in Cala, October 1958-March 1959*

DISTANCE ROWS	BETWEEN HILLS	SEEDS PER HILL	AREA PLANTED	YIELD PER HECTARE
centimeters		*number*	*hectares*	*cavans*
50	50	2	0.05	17.2
80	50	2	0.07	23.2
100	50	3	0.10	21.2

Those who grew hybrid corn generally accepted wider distancing. Many of those who had native varieties continued with their usual distancing, especially during the dry season. They were interested not so much in the grain yield as in the stalks for feeding their work animals.

Fertilizers. A low rate of fertilizer application was very common. A local field trial was conducted to show the effects of increasing the fertilizer applied (table 27). The farmers generally increased their rates, although usually not at the recommended levels.

Control of pests and diseases. Corn plants did not have serious pests and diseases. For mildew, roguing was recommended; chemical control was considered very expensive.

The more serious pest problem in storage was weevil damage. Farmers readily adopted the recommendation to treat the gunny sacks used for storing the corn because of its proven effectiveness and the relatively low cost involved.

TABLE 27. *Results of fertilizer trials on corn in Cale and Janopol, May-September 1959*

TREATMENT			YIELD PER HECTARE	
N	P	K	CALE	JANOPOL
	kilograms		*cavans*	
30	45	0	42	68
60	0	0	37	67
60	45	0	45	71
60	0	45	47	68
90	0	0	49	65
90	45	0	49	71
90	45	45	41	69

Hybrid Clustered Eggplant

The conservatism of farmers is well-known. However, it does not mean that they never change. It only takes much effort and time to make them change. Sometimes, they make changes beyond expectations, as may be seen in the following case.

The plant breeders in College were not willing to give out seeds of a newly developed hybrid clustered eggplant because the variety had not yet been purified and still had a high tendency to segregate. The plant was different from the usual varieties; it produced clusters of smaller fruits instead of a few large ones. However, farmers who saw the College plots insisted on trying it out, pledging not to blame the plant breeders if the results would differ from what they saw. One farmer in Cale and another in Janopol planted small trial lots in May, 1959. Another farmer in Cale followed by planting a large area for commercial purposes. This farmer later increased his plantings, using well selected seeds from his first crop The interest of other farmers was gradually aroused. One started his plantings with seeds from a stolen fruit. By 1960, the variety had become very common in Cale.

The hybrid clustered eggplant did not escape first-sight objections and biases. Some farmers claimed that the small size of the fruit would not appeal to retailers and consumers. However, they found later that this was an advantage. Retailers had more pieces to sell for a certain price and consumers got more for their money.

Garlic

One enterprise in which the technicians did not have much to improve was garlic production. The result of a benchmark study showed that garlic had the highest income potential per unit area. The farmers were, therefore, advised to expand their plantings. One farmer, who earlier had received a net return of P133 from his 0.06 hectare of garlic got P233 from his 0.15 hectare planting the following year.

Another farmer was eager to sell his garlic, then worth ₱500, because of high prices. He was persuaded to save it for planting the next season. This gamble paid off neatly with P2,000 the next year.

Another recommendation which was easily accepted was chemical control of *Pasik*, a fungus disease, and thrips, an insect pest. Treating the bulbs with chemicals before storing was also one of the widely accepted recommendations. It enabled the farmers to store their bulbs and to choose the time of sale later in the season, usually at higher prices.

Tomatoes

Tomato raising was another enterprise which the technicians did not have to improve. There was no interest in foreign varieties because none was better than native tomatoes in the market. The native varieties had thick pulp and could better stand transport and storage. In the absence of modern facilities for transport and storing, foreign varieties did not have a good chance of competing with the local varieties.

The serious disease of tomatoes during the wet season was bacterial wilt. Plant pathologists from the College who conducted a joint study with a commercial company were not able to give any recommendation for effective control. In the absence of effective control, tomatoes had to be planted during the dry season. Since fresh tomatoes were not canned or processed in the Philippines, the planting-harvesting and price of tomatoes were distinctly seasonal.

The farmers were, therefore, advised to try planting very early, or in the later part of the wet season. Even if fifty percent of the crop were destroyed by bacterial wilt, the farmers were still more than compensated by the high price of their early harvests.

Periodic spraying against tomato worms was the only recommendation that the farmers found helpful and which they readily accepted.

Los Baños Bush Sitao

A new crop introduced in the pilot barrios was the Los Baños bush sitao, a hybrid bean developed by crossing a California cowpea and a native climbing (pole) bean. Two farmers in Cale tried one ganta of seeds each in May, 1959.

One failed because he did not follow the recommendation to spray Endrin on his aphid-infested plants; he used DDT which was relatively cheaper. When the DDT spray proved ineffective, he used soap solution, which also failed. He barely recovered the seeds which had cost him P20 at the time.

The other farmer, however, followed all recommendations of the technicians and took good care of the delicate new crop. He harvested 1,515 kilograms of green beans and some seeds which brought him P522 from his one ganta planted on 0.22 hectare. Encouraged, he planted another ganta of seeds in 0.23 hectare lot. The result was not so dramatic as the first, but it still gave him a fairly high return of P151. On a per hectare basis, this would be above P600 which is much higher than the usual income from either corn or rice

Although one farmer failed, the success of the other aroused interest in the crop. In May, 1960, six farmers in Cale and twenty farmers in Janopol planted a total of 5.5 gantas and 3.0 gantas of seeds, respectively. In November and December of the same year, forty-eight farmers in Cale followed.

Los Baños bush sitao growing is now a common enterprise in Cale. In fact, it may be considered the farmers' primary reason for buying their own sprayers. Before the advent of bush sitao in Cale, there was only one sprayer in the barrio — one donated by the PACD. The bush sitao led some farmers to acquire more than one sprayer.

The acceptance of bush sitao has not been as fast in Janopol. However, its cultivation has spread to other barrios, including Linga, a lowland, lakeshore barrio. It has now spread to many areas of the Philippines.

The study of the adoption of this crop is interesting for a number of reasons: it was new and all the cultural requirements had to be introduced to the farmers. It matures to bearing age in 45 days and so the timing of operations must be exact. The short maturity period also makes it fit easily into most rotation schemes and facilitates adaptation to climatic differences and price changes. Farmers who are good in managing the crop get high returns, but those who are careless are likely to lose.

This farmer, Mang Estoy, succeeded in his first trial planting of the new crop, bush sitao, and subsequently expanded his plantings to commercial scale. His success helped arouse the interest of many others in the barrio and contributed to the fast spread of bush sitao not only in his own barrio but also throughout the country.

The bush sitao had its share of first-sight objections in addition to technical difficulties in its culture For example, it was claimed that the short pods were not attractive to retailers and consumers. Later experience, however, proved this wrong. Another subject of "bias at first sight" was the tenderness of the pods, at first considered a good characteristic of the crop. However, the report from Albay, a province in Southern Luzon, said that housewives did not like the bush sitao because it was easily overcooked. Minor adjustments in cooking time solved this problem.

At first, there were some difficulties in obtaining seeds. Some smart agricultural traders realized the potential business in bush sitao seeds. They encouraged its production and distribution. Later on farmers did not have to buy new seeds because the bush sitao variety was stabilized and the progeny came true to type. Thus, the supply of seeds has never been short of the actual demand.

Poultry

Poultry on a commercial scale was recommended as an addition to the usual crop enterprises in order to make use of the family labor which was not gainfully employed. Another reason for recommending it was that it does not require additional land which often limits possibilities for expanding the size of farm business.

Poultry used to be a major enterprise of farmers in Janopol before World War II. It was abandoned during the war and was never rehabilitated. Cale and Halang farmers did not engage in it; neither did they have commercial poultry enterprises at the start of the project, although most farmers in the three barrios had a few native chickens which were raised in the usual manner, freely roaming and partially or wholly self-supporting. In Linga, however, poultry was a growing industry.

The first major recommendation to many farmers, therefore, was to incorporate poultry in their farm business. Those who became interested were guided in planning the house, obtaining chicks, feeding, and caring for the flock. Those who were already engaged in the enterprise were taught specific practices like proper feeding, vaccination, and culling.

The technicians recommended egg production in preference to growing broilers. The latter requires a much larger volume of business, more rapid turnover of chicks, and a much higher level of management to be economically profitable.

Nothwithstanding the technicians' recommendations, several farmers were convinced by a hatchery owner to buy broiler chicks with the promise of buying the broilers after 10 weeks at ₱2.00 per kilogram liveweight. Unfortunately, the price of broilers went down to ₱1.40 per kilogram when the birds were ready for market. The hatchery owner did not fulfill her promise to pay ₱2.00 per kilogram liveweight, and the farmers did not recover even the cost of feeds.

Following the technician's advice to go into egg production, the farmers bought a great number of layer chicks in March and April, 1959. The acquisition of broiler chicks the following month, May, was primarily speculation for high broiler demand in the neighboring province of Laguna, during the 10th Boy Scout World Jamboree in July (table 28).

TABLE 28. *Number of chicks acquired by breed and month of acquisition in Cale and Janopol, January-May 1959*

MONTH	NUMBER OF CHICKS Broiler a	 Layer b	 Native
		number of chicks	
January	575	57	348
February	376	—	—
March	787	1,882	—
April	202	651	—
May	970	204	—
Total	2,910	2,794	348

a Lancaster and New Hampshire breeds.
b White Leghorn breed.

Chick mortality and immunization campaign. One of the most serious deterrents to commercial poultry enterprises is the dread of *peste,* the local term for epidemics. *Peste* reportedly occurred with every change of season.

The technicians advised immunization of chicks against the most common disease, avian pest. Some farmers, however, did not heed this advice. Serious losses of chicks occurred in non-immunized flocks (table 29).

TABLE 29. *Chick mortality by month in Cale and Janopol, January-April 1959*

MONTH	NUMBER OF FLOCK	NUMBER DIED	PERCENTAGE
January	980	10	1
February	1,346	97	7
March	2,984	160	5
April	3,204	331	12

Mortality in April was extraordinarily high: in one case, 103 out of 104 chicks died. This loss was traced to poor sanitation and inadequate isolation. The owner had no poultry house when he bought his chicks. He made a temporary brooder under his house. The brooder was not fenced and stray chickens could feed from the feeding troughs attached outside the brooder together with those confined in it. Furthermore, children often pitted their small fighting chickens against those in the brooder.

Many farmers learned from experiences like the farmer above; however, some learned slowly (table 30).

TABLE 30. *Proportion of birds immunized in Cale and Janopol, January-May 1959*

BARRIO	NUMBER IN FLOCK	IMMUNIZED AGAINST	
		Avian Pest	Pigeon Pox
		per cent	
Janopol	3,222	71	11
Cale	958	51	—
Total	4,180	67	9

Local hatching of eggs. There are always smart operators. When the interest in poultry was rising, two farmers decided to establish their own hatchery. Each bought a kerosene incubator. The hatchery was designed to supply their own needs as well as those of their neighbors, at a little profit. These operators were helpful in accelerating the growth of the poultry industry in the barrio. However, they caused a setback. The chicks locally hatched did not perform well as layers because the operators did not follow the technician's advice to select the hatching eggs from good layers.

A farmer in another barrio who became more engrossed in poultry than in his crop farm also decided to put up his own hatchery. At first he did not want to buy the more expensive but better eggs.

Very recently, however, he concluded that it would be more profitable to hatch better although more expensive eggs. Since then he has been buying hatching eggs from College or from other high-standard, commercial hatcheries.

Feeding. Most farmers had been using commercial feeds with little supplement of farm-produced materials. The technicians advised the farmers to mix their own feed rations. Feed ingredients, when bought unmixed, were cheap; in addition, they could be replaced by local materials like ground corn and rice bran.

In the lakeshore barrio, Linga, the livestock technician analyzed the nutritive value of ground *ayungin,* a local species of small fish, and found that it was fairly comparable to the commercial fish meal. On analyzing the costs, he found that at certain times of the year when the *ayungin* was abundant, it would be much cheaper for the farmer to buy either dried or fresh *ayungin* and process (dry and grind) it himself.

The local feed mixing recommendation did not make any headway. Local feed suppliers carried more of the mixed feed rather than the separate feed ingredients. Additional studies on the technical aspects of processing *ayungin* into fish meal are needed.

The effect of feed poisoning. In the fourth week of August, 1960, the largest feed supplier in Manila distributed a three-day batch of laying mash which caused feed poisoning throughout Central and Southern Luzon. Many flocks had already been affected before the poisoning was discovered. Egg production plummeted (table 31).

TABLE 31. *Egg production record of four poultry enterprises in three pilot barrios, August 18-29, 1960*

DATE August 1960	NUMBER OF EGGS Farm L-AKA	Farm L-ALB	Farm I-RKJ	Farm C-LCM
18	101	183	31	64
19	102	210	31	66
20	106	196	30	66
21	105	204	29	71
22	100	207	23	69
23	102	195	21	71
24	90	187	15	76
25	51	194	18	74
26	35	128	10	45
27	14	71	8	10
28	7	57	7	2
29	5	33	9	2

The layers had to be sold for kitchen purposes. Although the company paid to compensate for the farmers' losses, the incident ended many a small poultry enterprise. Only the larger enterprises survived. A few small, forward-looking, risk-taking and fairly good operators rehabilitated their flocks and have continued to do good business in poultry.

The problem of finance management. When the flock started paying off with eggs, many farm of families showed a tendency to increase consumption. They forgot to set aside some earnings for the time when the flocks would have to be changed. When that time came, no capital was available. They had to borrow again to renew their flock. The seemingly endless borrowing and paying back discouraged many farmers.

Piggery

The swine situation at the start of the project was similar to the poultry in Janopol, Cale, and Halang. A farm family would have one or two native pigs roaming freely and scavenging for most of their upkeep. The pigs would be fattened and later butchered during the yearly fiesta or other significant events, e.g., baptism or wedding. Sometimes, they would be sold to meet emergency needs for cash. Swine raising then was not a planned enterprise for business ends.

Improper feeding lack of sanitary housing, and pests and diseases contributed to the rampant losses in the swine population. As in poultry, the fear *peste* posed the most important single barrier to investment of funds commercial swine enterprises.

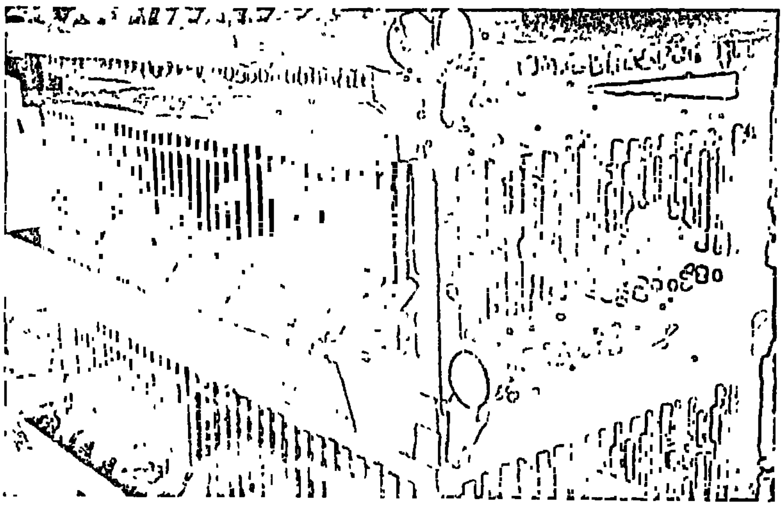
Immunization and treatment. The first major step in improving the swine industry is the immunization of pigs from the most serious diseases, hog cholera and swine plague. Reduced mortality of immunized pigs greatly helped the technicians in gaining the confidence of the farmers. Immunization against and treatment of diseases increasingly gained acceptance. Some farmers learned to diagnose accurately and describe the more common diseases. A few learned to immunize and treat simple cases. In one barrio where the swine industry has become the number one agricultural innovation, the farmers now jokingly remark that "the *peste* is afraid of hogs; it has not come around since the rise of the swine population."

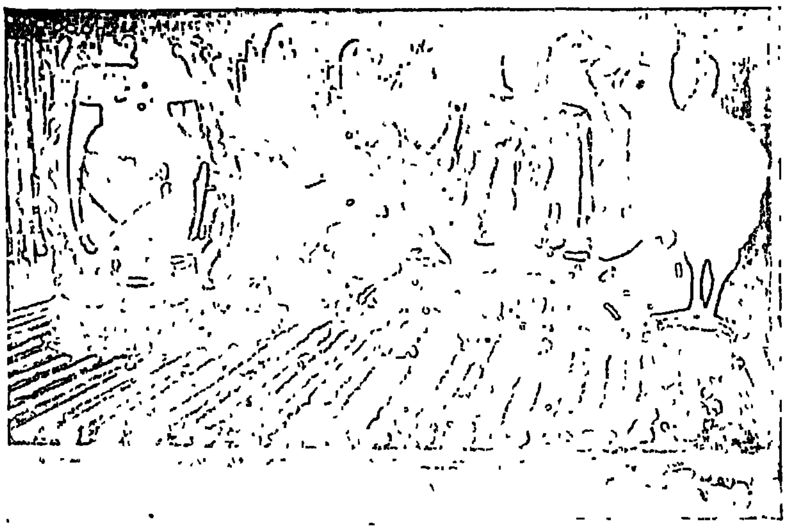
Confinement. The second major innovation in the swine industry was the confinement of the animals. The first step from the free roaming system was tying the pigs under the farmers' dwellings. Later some farmers built pig corrals. Still later, some built pig sites of bamboo and other local materials.

When the interest in commercial swine enterprises gained momentum, many farmers shifted to hog houses of much more durable materials, such as concrete for the floor, hollow blocks or lumber for the walls and frames, and galvanized iron sheets for the roof. This development was both heartening and alarming. On one hand it was indicative of the success of the technicians' efforts in convincing the farmers to build hog houses. On the other hand, it made the farm development technicians fear that the farmers might be putting all their money in

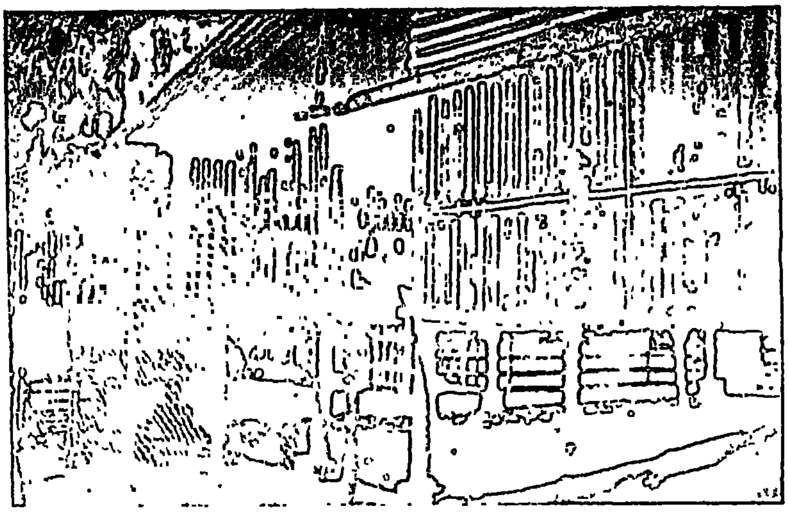
Rearing the newly bought chicks in this improvised brooder (left) is one of the first steps learned by Mang Genio (hidden except left hand) of Barrio Halang.

This well designed brooder (right) is labor saving and very sanitary. Made mostly of bamboo, it is well ventilated. The droppings are collected on solid galvanized iron sheet below the bamboo floors. The cleaning is easily done by pulling out the iron sheets.

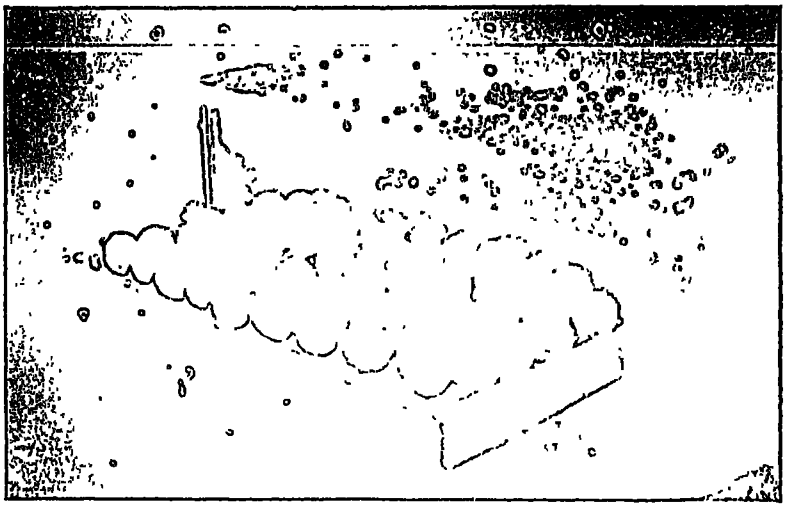




These healthy chicks (left) must be giving Mang Genio a lot of pride and also confidence about the future profit and loss statement.



Confinement of laying poultry is a must. This poultry house of Mang Dama (left) is the first and smallest of his three poultry houses at present.



Maintaining an incubator is a more advanced step in the poultry enterprise. Mang Dama, the owner of this incubator (right) hatches eggs to expand and replenish his stock. In addition, he stimulates development of the industry by selling chicks to other farmers.

"swine palaces" with only skinny, improperly fed native pigs to house. Fortunately, this fear was unfounded.

Breed improvement. Native pigs can not compare favorably with graded, much less with purebred pigs in the capacity to grow with the feed they consume. The technicians, therefore, embarked on a campaign for breed improvement.

The first step was to make use of artificial insemination. In Tanauan, arrangements were made to facilitate farmers' requests for artificial insemination service whenever their sows were in heat. After they had filled out a request form at the Farmers' Cooperative Marketing Association (FACOMA) office and paid the telephone charges, the FACOMA personnel contacted the Artificial Insemination Service. A few successful results helped arouse interest in artificial insemination.

The arrangements were not completely satisfactory. It was still difficult to get timely service and the rate of successful conception was low. A few progressive farmers were, therefore, persuaded to buy purebred boars and later to sell boar service in the community. They charged one weanling or P10 for each successful service. This scheme helped hasten breed improvement in the pilot barrios.

Berkshire and Duroc Jersey were the most popular breeds. At present, the graded pigs are mostly crosses with either of these two. More recently, the Landrace has become increasingly popular. The first purebred Landrace boar in the pilot barrios was obtained in January, 1963. Another purebred pair, a boar and a gilt, were bought in March, 1963. The charge for boar service with this breed is P30 per successful conception.

Fattening hogs and selling weanlings. Most farmers started out in the fattening business. They bought a few weanlings and sold them after fattening.

Some farmers were then convinced to go into weanling production. They maintained good sows and had them serviced by purebred boars. Selling two-month-old weanlings at a price range of P30-P60 gave more profits than fattening but required more managerial skill.

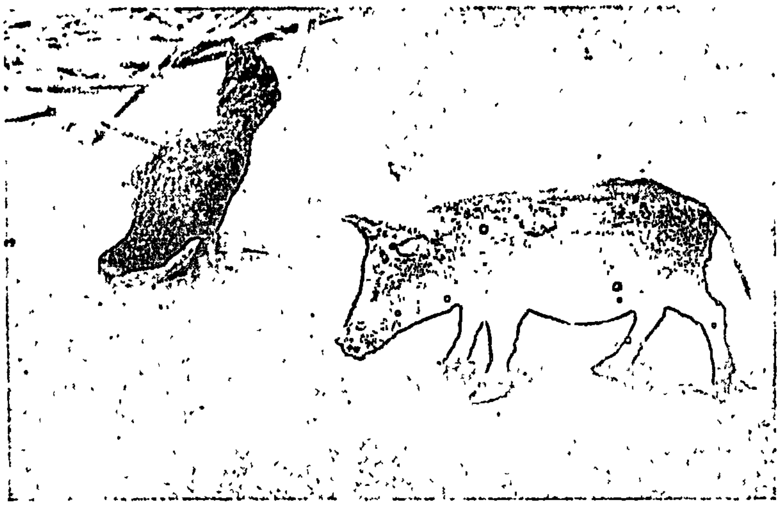
Expansion of the swine industry. Janopol has led in the expansion of swine enterprises. It is now a recognized source of good stock. As of January, 1963, it had 68 small commercial enterprises (table 33). The number included only those classified as commercial or those with hog houses and improved management. It did not include, however, those weanlings already sold.

TABLE 32. *Commercial swine enterprises, January 1963*

ITEM	CALE	JANOPOL	HALANG	LINGA	TOTAL
Number of enterprise	16	68	4	9	97
				number of animals	
Duroc Jersey	7	180	1	—	188
Chesterwhite	—	1	—	—	1
Berkshire	—	1	—	—	1
Landrace	—	3	—	—	3
Native	—	10	—	4	14
Crosses	56	210	20	56	342
Not specified	11	52	—	—	63
Total	74	457	21	60	612

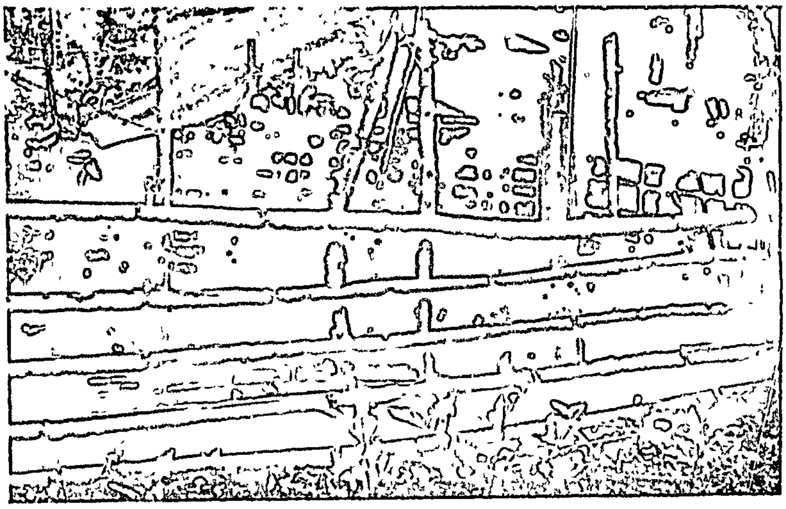
Illustrations of Experiences with Specific Practices

Discussion of experiences with individual enterprises showed clearly specific practices involved. Additional specific practices which cannot be limited to one or two enterprises may also be meaningful. Examples of such practices are credit financing, composting, record keeping, farm business analysis, and farm planning.

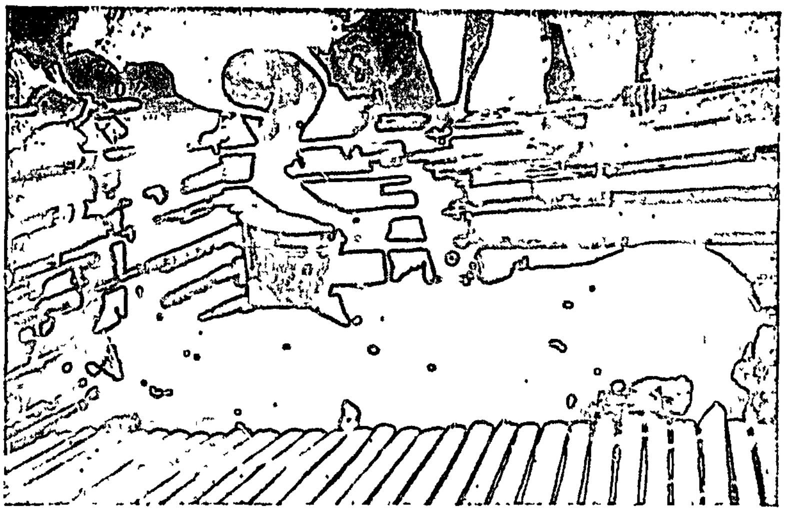


This free congenial co-existence of the hen and the skinny pig (left) is discourage by the farm development technicians because it insures the ever-recurring and dreaded peste or epidemic.

A little improvement over the uninhibited freedom is tying the pigs (right). This is a good first step, although it is far from satisfactory. Tying by the neck is especially dangerous.

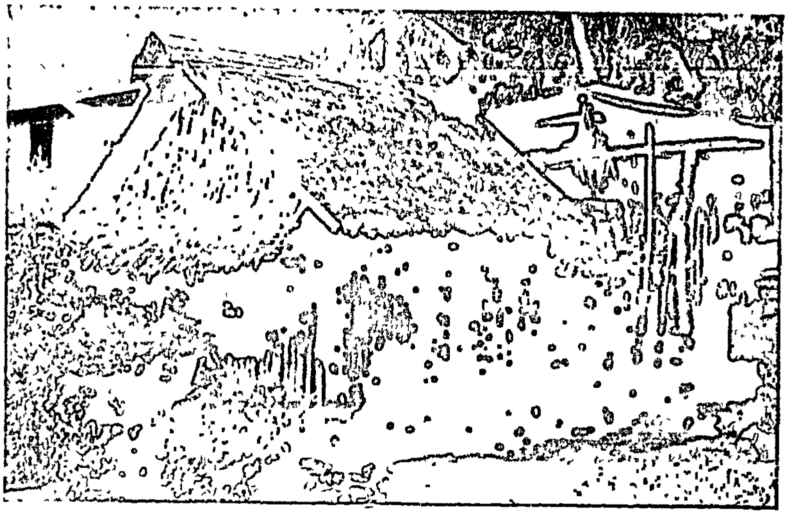


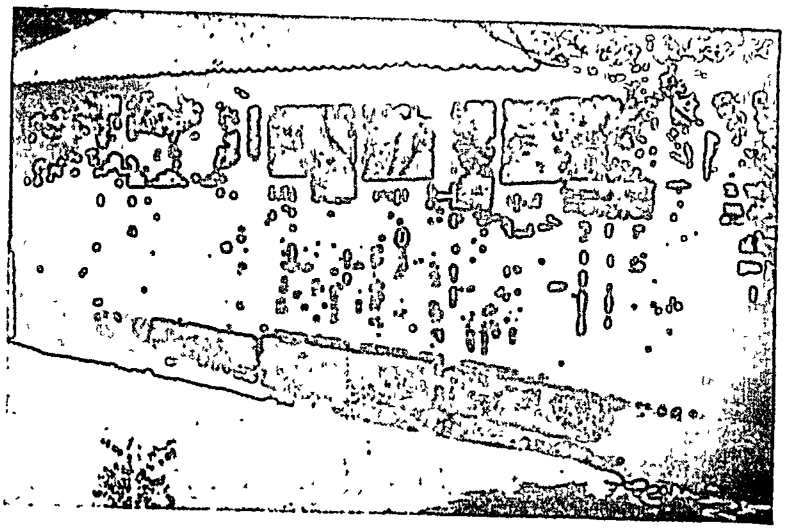
This very temporary improvisation (left) of Mang Doni of Barrio Janopol is a good start. He will have a better one later, depending upon his realization of the importance of a hog house and the resources he can muster.



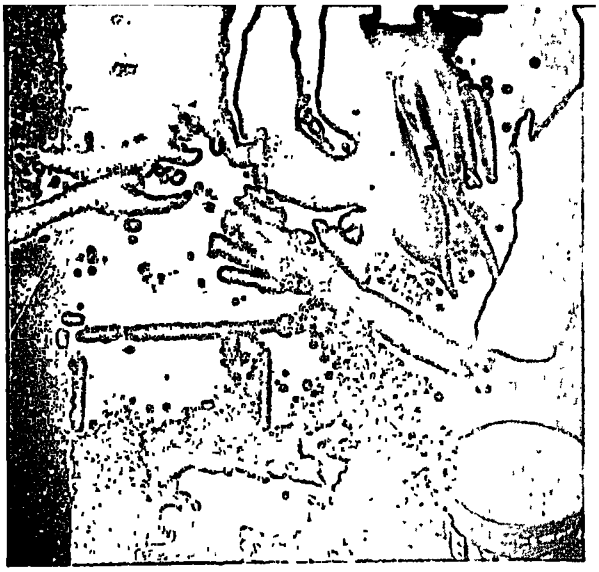
Mang Feling of Barrio Halung has a cleaner and more orderly pig pen. He may not change this soon, but it is all right. The walls may have to be reinforced.

This hog house (right) of Mang Roman is more sturdy than the rest so far. It would have been better if the walls did not extend up to the roof.





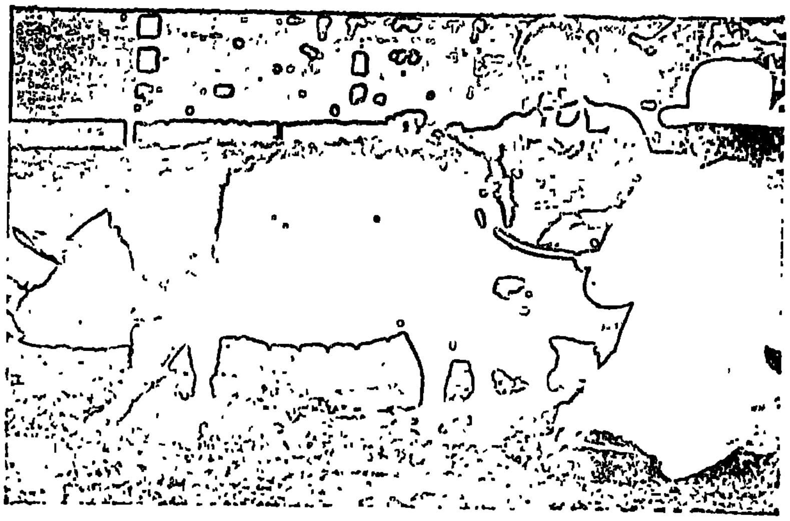
This hog house (left of Mang Lucio is a more permanent structure. Concrete floor, lumber wall and frame, and galvanized iron roofing will allow many generations of pigs to use it.



Castration at an early age of fattening pigs is advisable. Mang Tomas (left) of Barrio Janopol is assisted and partly supervised by the Livestock Technician.

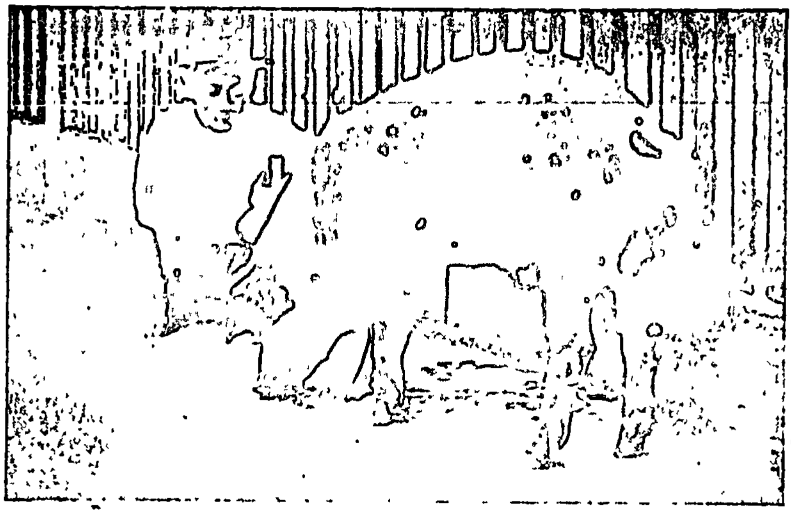
Proper mixing of feeds is one of the important lessons given to farmers. Mang Feling (right) of Barrio Halang is being assisted and partly supervised by the Livestock Technician.

Immunization against and treatment of diseases are more easily accepted and implemented by farmers. Mang Edong (left) of Barrio Janopol is now a recognized local technician.

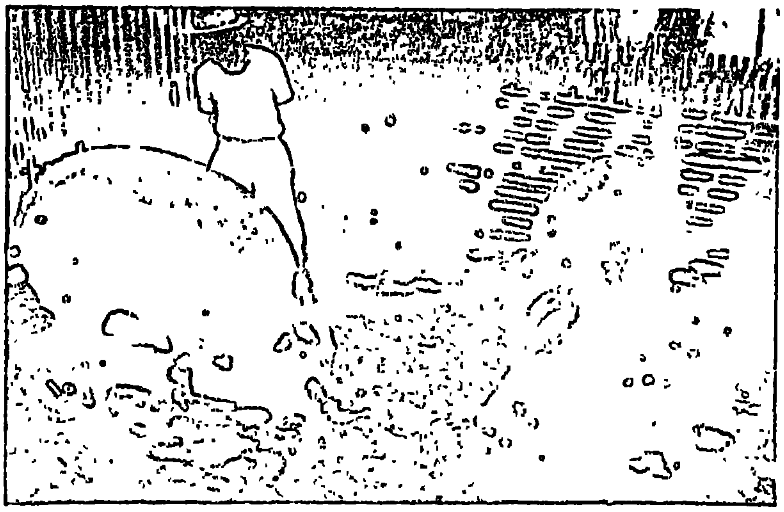


Upgrading the stock is one of the essentials in livestock production. The sow of Mang Cenon is being artificially inseminated (left) with semen from a purebred Duroc-Jersey boar.

Many farmers still insist on natural service by the boars. So Mang Tomas of Janopol (right) proudly keeps in good condition his newly acquired purebred Duroc-Jorsey boar.



The same can be said of Mang Lucio and his newly acquired purebred Landrace boar (left).



Mang Tomas (left) fondly and proudly keeps watch over his herd. In addition to expected monetary returns, the pleasure derived in "just watching" healthy pigs may be considered.

The same can be said of Mang Julian and his daughter (right).

Credit Financing

Lack of capital is a commonly deplored problem among farmers. It is claimed that availability of credit is the key to progress in agriculture. Experience in the pilot and in neighboring barrios gives an insight into this issue.

Most of the first poultry enterprises in the pilot barrios were established by using the farmers' increased incomes from their crop enterprises. The farmers who became successful in their trial ventures were convinced to expand their enterprises further with the use of credit. A private commercial bank in one town and a rural bank in another became interested in supervised credit for livestock enterprises. The educational efforts of the farm development technicians coupled with available credit promoted a faster growth of the poultry industry.

This compost house of Mang Roman in Barrio Janopol shows how Janopol farmers now regard the value of compost.

Many farmers have less expensive but equally useful compost pits, like this one of Mang Genio of Barrio Halang.

Credit without technical know-how proved disastrous, however. This was illustrated in the neighboring barrios. Encouraged by the success of farmers in the pilot barrios and aided with credit from the bank, many farmers established commercial poultry enterprises. However, in one year's time or so, most of these enterprises flopped.

The experience with swine was almost similar to that of poultry. Some hog houses which had been built with either borrowed funds or savings and increased incomes from the crop enterprises, became empty after some failures.

Composting

The use of manure compost in addition to commercial fertilizers was recommended. This has been widely accepted in the upland barrios and Linga. The acceptance could be due to the fairly large quantities of swine manure and chicken dung in these barrios.

Record-keeping and Farm Business Analysis

The more difficult innovations were those that did not give direct and tangible results, like record-keeping and farm business analysis. It took a good deal of business orientation before farmers were made to see the usefulness of these practices. It took at least a season or a year of recording before the farm business could be analyzed. In the meantime, the farmers experienced the difficulty of the task of recording.

At the end of the season or year, the farmers found it difficult to follow the procedures of analysis. It was much more difficult to develop an appreciation of the results. This could be gleaned from the following most common comments:

> " . . What if we now our receipts and expenses; they are already past. Nothing can be done about them . . ."
> ". . . Your computations say I have so much net income. But where is it? I do not have it in my pocket. . ."
> " . . . If you set a value on our labor and add all the cost, I am sure I will be losing. So why record them when they just give a depressing picture . . ."

With these impressions about record-keeping and farm business analysis, it was not surprising to find even the primary cooperators not doing these activities on their own (table 33). Some who kept their help the farm development technicians obtain data.

Farm Planning

In the early stages of the work in the pilot barrios, much time was spent in arousing the farmers' interest in the various alternatives in farming practices and enterprises. It was only later when the farmers had developed confidence in the technicians and in the innovations that farm planning made some sense.

Illustrations of Experiences With Individual Farmers[3]

The problems and difficulties in introducing innovations, the rate of and reasons for their acceptance or rejection, and the end results for the farmers have been illustrated with experiences in individual enterprises and practices. A discussion of the experiences of individual farmers may provide information on the process of change that occurred from year to year.

Farmer Cooperator LH-LAII

This case may represent the lowland rice farmers. Tenant LH-LAII may be considered one of the progressive farmers in his barrio. As will be seen later, however, his improvements and progress were limited, compared with those of the upland farmers.

In 1958, LH-LAII was 32 years old. He had no formal education. His 26-year-old wife finished four years of grade school (table 33).

TABLE 33. *The family of LH—LAII, 1957-1958*

FAMILY MEMBER	DESCRIPTION	
	Age	Educational Attainment
	years	
Operator	31	None
Wife	25	4th grade
Sons 1	8	2nd grade
2	5	—
3	3	—
Daughters 1	6	—
2	1	—

He was renting a 1.96-hectare lowland rice farm with a pump irrigation system provided by his landlord. His lot was much below the average of 3.7 hectares in his barrio. He did not have any other crop, nor did he have any commercial livestock or poultry enterprise. His few native chickens and pigs were not well cared for, were not confined, and were partially self-supporting (table 34).

TABLE 34 *The farm resources of LH—LAII, April 1958*

FARM RESOURCES AND OWNERSHIP	VALUE	NUMBER
		pesos
Landlord	1.96	9.800
Farm land (hectares)	1	9,115
Irrigation pump	—	12
Supplies	—	18,927
Sub total		
Operator		
Work animal	1	400
Chicken	15	20
Tools and equipment	7	102
Dwelling	1	600
Supplies	—	12
Sub-total	—	1,134
Grand total	—	20,061

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[3] The farmers cited were given code identification to fulfill the promise of researchers that information would be kept confidential.

The important features of his rice culture were the broadcast method of planting or direct seeding in the field, seeds of common varieties (not certified seeds of recommended varieties), trampling the weeds, and low level of fertilizer application.

Tables 35 and 36 show rice yield and the net farm earnings in different years and seasons. The first changes in practices were made in the dry-season crop of 1958-1959. The indirect method, growing the seedlings in a seedbed and then transplanting them to the field, was used. Nitrogen application was increased; urea, instead of ammonium sulfate was used. The farmer agreed to try certified seeds; unfortunately, they were not available at the time.

TABLE 35. *Yield per hectare on the lowland rice farm of LH-LAH, 1957-1958 to 1961-1962*

CROP SEASON	AREA PLANTED	PRODUCTION PER HECTARE 1957-58	1958-59	1959-60	1960-61	1961-62
	hectare			*cavans*		
April-September	1.92	57	51	63	47	51
Sept.-February	1.91	a/	42	40	74	71

a Dried up; pump did not work.

During the wet season of the following year, 1959-1960, additional changes were made. Straight-row planting was attempted. Although no planting boards or strings were used and the rows were not straight as recommended, there was enough space for the rotary weeder to pass. The yield of this crop was 12 cavans higher than that of the previous wet-season crop and, of course, was much higher than the previous dry-season crop.

There were no additional changes in the following dry-season crop. However, the farmer tried out in small plots the eight recommended varieties of lowland rice. These trials did not bear significant results because they were damaged by typhoons.

In the following wet season, 1960-1961, the crop suffered from floods and typhoons. The yield decreased.

During the following dry season, some parcels were planted to two recommended varieties, Intan and Tjeremas, and to the commonly grown variety, Wagwag. Furthermore, four parcels were planted in straight rows. The results of this straight-row trial were not very much different from those of the other parcels. The argument for the method may, therefore, be just the possibility of using the rotary weeder in doing a fairly thorough job of weeding.

On the whole, there was a big increase in yield, even over that of the wet season.

In the following wet season, 1961-62, the farmer planted a non-recommended variety, Macan. This was one of the three popular early-maturing varieties. Of the three, it commands the highest price. It was

TABLE 36. *Cost and returns of LH-LAH, 1957-1958 to 1961-1962*

CROP	1957-58			1958-59			1959-60			1960-61			1961-62		
	Gross Receipts	Farm Ex-penses	Net Re-turns	Gross Receipts	Farm Ex-penses	Net Re-turns	Gross Receipts	Farm Ex-penses	Net Re-turns	Gross Receipts	Farm Ex-penses	Net Re-turns	Gross Receipts	Farm Ex-penses	Net Re-turns
					p	e	s	o	s						
Lowland palay															
Wet	1085	735	350	882	625	257	1080	745	335	939	640	299	1328	896	432
Dry	—	—	—	960	688	272	912	655	257	1271	864	407	1632	1001	630
Livestock															
Cash and															
Non-cash	—	41	—41	150	—	150	180	138	198	100	30	70	760	89	691
Total	1085	776	309	1992	1313	679	2172	1538	790	2310	1534	776	3720	1986	1753

said that in the previous year, one farmer got a high yield from this variety. However, because of typhoons and floods, this particular crop reduced in yield.

Wagwag, the most common variety, was planted the following dry season. With no additional changes in practices other than the ones mentioned earlier, this particular crop had a fairly good harvest of 71 cavans per hectare, second to the farmer's highest in the previous year.

Throughout the five years, 1957-58 to 1961-62, the farmer had some increases in income generally due to increases in yield. With high prices and increased yield in 1961-62, his income was very high.

As was pointed out at the start, farmer LH-LAH did not have any commercial enterprise besides rice. However, he was stimulated to try patches of different upland crops, such as hybrid corn, sweet corn, bush sitao, cowpea, lima beans, okra, pechay, and cabbage. A few crops had some fair results but on the whole, the field trial was not a success. The soil caked because of its nature and intense heat.

Farmer Cooperator MH-MIA

This case may represent some of the less fortunate lowland rice farmers. The tenant, MH-MIA may be considered average in industry and eagerness for possible changes.

In 1958, MH-MIA was 49 years old. Neither he nor his 43-year-old wife had attended school. His two small sons, however, were going to school (table 37).

TABLE 37. *The family of MH-MIA, 1957-1958*

FAMILY MEMBER	AGE	EDUCATIONAL ATTAINMENT
	years	
Operator	48	None
Wife	42	None
Son 1	11	3rd grade
2	7	1st grade

He was renting a 2-hectare-farm with a pump irrigation unit provided by the landlord. The area was below the average of 3.7 hectares in his village. Like the other farmers, he grew no other crop and had no commercial poultry or livestock enterprise. His few native chickens and pigs were not really managed. They ran loose and were self-supporting (table 38).

On the advice of the technicians, farmer MH-MIA changed from the direct method of broadcasting the seeds in the field to the indirect method of growing the seedlings in the seedbed and transplanting them later. He also started planting straight rows and using certified seeds of recommended varieties. All these changes, however, were of no avail

TABLE 38. *The farm resources of MH—MIA, April 1958*

FAMILY RESOURCES	NUMBER	VALUE
		pesos
Landlord		
Farm land (hectares)	2	6,000
Irrigation pump	1	2,571
Supplies	—	37
Subtotal	—	8,608
Operator		
Work animal	1	450
Chicken	1	2
Tools and eqiupment	7	87
Dwelling	1	300
Supplies	—	37
Subtotal	—	876
Grand total	—	9,484

because the irrigation pump was removed by the owner for fear of loss (two adjacent pumps had already been stolen at the time.) The removal of the pump prevented the farmer from having two rice crops a year and from doing more of the recommended practices. His yield fluctuated and his income was greatly reduced (tables 39 and 40).

TABLE 39. *Yield per hectare on the lowland rice farm of MH—MIA, 1957--58 to 1961-62*

CROP SEASON	AREA PLANTED	1957-58	PRODUCTION PER HECTARE 1958-59	1959-60	1960-61	1961-62
	hectares			*cavans*		
May-September	2	83	58	38	55	68
August-February	2	68	55	a/	a/	a/

a The pump irrigation unit was removed, and the farmer could not plant a second crop.

Farmer JL-JDD

Farmer JL-JDD was a lowland rice farmer who started a small commercial poultry enterprise after two years of working closely with the Farm Development technicians. A part owner, JL-JDD may be considered average in industry but eager to improve.

In 1958, he was 49 years old. He had finished five years of grade school while his 54-year old wife had finished four. His son was in the second year of high school and an older daughter was in the second year of college (table 41).

TABLE 40. *Cost and returns of MH-MIA, 1957-58 to 1961-62*

CROP	1957-58			1958-59			1959-60			1960-61			1961-62		
	Gross Receipts	Farm Expenses	Net Returns	Gross Receipts	Farm Expenses	Net Returns	Gross Receipts	Farm Expenses	Net Returns	Gross Receipts	Farm Expenses	Net Returns	Gross Receipts	Farm Expenses	Net Returns
Lowland palay															
Wet	1211	840	371	461	381	80	384	291	93	547	384	163	680	462	218
Dry	1336	918	418	608	535	73	—	—	—	—	—	—	—	—	—
Livestock															
Cash and Non-cash	15	55	—40	71	13	58	35	44	—9	5	25	—20	—	45	—45
Total	2562	1813	749	1140	929	211	419	335	84	552	409	143	680	507	173

TABLE 41. *The family of JL—JDD, 1957-1958*

FAMILY MEMBER	AGE	EDUCATIONAL ATTAINMENT
	years	
Operator	48	5th grade
Wife	53	4th grade
Son	17	2nd year high school
Daughter	19	2nd year college (commerce)

Farmer JL-JDD was renting 2.74 hectares of riceland without irrigation. This was a little above the average of 2.4 hectares in his barrio. He had his own small parcel of a .25 hectare home lot and a few ducks from the egg sales of which he got ready cash. His few chickens and pigs were mainly for home consumption during special occasions, or for sale during emergency cash needs (table 42).

TABLE 42. *The farm resources of JL—JDD, April 1958*

FARM RESOURCES AND OWNERSHIP	NUMBER	VALUE
		pesos
Landlord		
Farm land (hectares)	2.74	8,220
Operator		
Farm land (hectare)	0.25	1,250
Work animals	2	600
Swine	3	60
Poultry	26	44
Tools and equipment	8	50
Dwelling	1	400
Supplies	—	88
Subtotal	—	2,472
Grand total	—	10,692

The important features of his rice culture showed several possibilities for improvement. He did not use certified seeds for planting materials. He sowed the seeds thickly in the seedbed resulting in overcrowded, weak seedlings. He transplanted 45-day-old seedlings. The distance of planting in the field was much too close and the seedlings were not planted in straight rows. He did not use fertilizers. He did not weed properly; he selected only the areas with thick weeds and weeded them by the trampling method.

His yield was very low during the pre-study year due to severe drought. His farm suffered strongly from the drought because no irrigation water was available that year (table 43).

A few changes were made in the 1958-59 planting. The seeds were sown less thickly and were fertilized. More vigorous seedlings resulted. They were transplanted at the age of 30 days. Instead of the usual 10 seedlings only three to four were planted to a hill. One big paddy was planted in straight rows at a wider distance (30 x 30 centimeters). The trial plot was weeded with a rotary weeder. This crop yielded 69 cavans per hectare.

In the following year, 1959-60, a few more changes were made. Adverse conditions helped the farm development technicians introduce the changes. The farmer's seedlings were attacked by army worms and the technicians advised spraying the seedbed with Endrin. Although the spraying was helpful, a loss in seedlings could not be avoided.

The farmer was forced to obtain additional seedlings. He was advised to get them from another farmer cooperator who had sown certified seeds of the recommended variety, Intan. Thus, he judged for himself the performance of the recommended variety which had shown superior yields.

However, in the following year, 1960-61, the farmer went back to his common variety, Wagwag, for two reasons. The new varieties were not yet popular in the market while Wagwag was already commanding a good price. Of course with increased yields, the price difference could be offset, but there was the additional problem of getting certified seeds. So, the farmer agreed with the landlord to stick to the common Wagwag variety.

In addition to the changes in crops, JL-JDD made significant changes in the livestock enterprises. He first accepted the recommendation to vaccinate his pigs. Then he sold his flock of ducks in 1960 and made plans to go into poultry. From this sale plus his income from palay, he built a poultry house and bought more than 200 straight-run White Leghorn chicks.

His increase in income came mainly from his increases in crop production. The new poultry enterprise has not yet contributed much to his income (table 44).

TABLE 43. *Yield per hectare on the lowland rice farm of JL-JDD, 1957-1958 to 1961-1962*

CROP SEASON	AREA PLANTED	PRODUCTION PER HECTARE				
		1957-58	1958-59	1959-60	1960-61	1961-62
	hectares			*cavans*		
June-September	2.74	12	69	60	24	74
Sept.-February	2.74	—	—	—	50	—

TABLE 44. *Cost and returns from the farm of JL-JDD, 1957-58 to 1961-62*

CROP	1957-58			1958-59			1959-60			1960-61			1961-62		
	Gross Receipts	Farm Ex-penses	Net Re-turns	Gross Receipts	Farm Ex-penses	Net Re-turns	Gross Receipts	Farm Ex-penses	Net Re-turns	Gross Receipts	Farm Ex-penses	Net Re-turns	Gross Receipts	Farm Ex-penses	Net Re-turns
							pesos								
Lowland palay															
Wet	456	354	102	1896	1178	718	1632	1064	568	715	614	101	2436	1501	935
Dry	—	—	—	—	—	—	—	—	—	1839	1267	572	—	—	—
Coconut	21	—	21	150	—	150	140	—	140	60	—	60	20	—	20
Poultry															
Non-cash	—	—	—	—	—	—	—	—	—	193	20	173	55	—	55
Cash	—	—	—	—	—	—	—	—	—	2002	1407	595	1753	1270	483
Livestock															
Cash and Non-cash	87	30	57	111	—	111	189	143	46	200	170	30	9	—	9
Total	564	384	180	2157	1178	979	1961	1207	754	5009	3478	1531	4273	2771	1502

Farmer LC-LBM

Farmer LC-LBM may represent upland farmers who can diversify their crop enterprises and possibly add swine and poultry enterprises to the business. A part-owner operator, LC-LBM may be considered above average in industry, curiosity about new ideas, and eagerness to improve. Improvements on his farm raised his income to a position higher than that of some of his equal or even those who were his superiors earlier.

In 1958, LC-LBM was 41 years old. He and his 36-year-old wife had completed four years of grade school. His older son and older daughter were already in high school. (table 45).

TABLE 45. *The family of LC—LBM, April 1958*

FAMILY MEMBER	AGE	EDUCATIONAL ATTAINMENT
	years	
Operator	41	4th grade
Wife	36	4th grade
Sons 1	15	3rd year high school
2	5	—
Daughters 1	14	2nd year high school
2	7	2nd grade

Farmer LC-LBM was operating a farm of 1.75 hectares. The area was much below the average in his barrio. Of the total, he owned 1.20 hectares; the rest was rented (table 46).

At the start of the study in 1958, LC-LBM had one fattening pig and a few native chickens in addition to his work animal. He had not tried raising swine or poultry on a commercial scale. Both the chickens and the pig were not confined and were self-supporting.

TABLE 46. *The farm resources of LC—LBM, April 1958*

FARM RESOURCES AND OWNERSHIP	NUMBER	VALUE
		pesos
Landlord		
Farm land (hectares)	0.25	2,500
Operator		
Farm land (hectares)	1.20	6,500
Work animal	1	800
Swine	1	30
Poultry	12	23
Tools and equipment	5	180
Dwelling	1	1,000
Supplies	—	5
Subtotal	—	8,048
Grand total	—	10,548

When LC-LBM was selected as one of the primary cooperators, he had already set his cropping pattern for the wet season. In the dry season, he made a trial planting of hybrid corn, the first ever planted in the barrio. He was not yet convinced that major changes in his cropping pattern would be profitable. He was, however, eager to learn new practices applicable to his crops. He learned about the use of different insecticides; previously he had used only DDT on all kinds of crop pests.

At the end of the first year of working closely with the farm development technicians, LC-LBM gained sufficient confidence in them and their advice. His land use and income pattern were similar to those of the entire barrio. Most of the cropland was planted to the low-income staple crops, rice and corn. Only very small patches were planted to high-income crops (table 47).

TABLE 47 *Land utilization, timing, labor requirement and income from crops of LC-LBM, 1958-1959*

CROP	AREA PLANTED	MONTHS GROWN	LABOR NEEDED	INCOME
	hectares		*man-days*	*pesos*
Upland palay	1.23	March — October	104	740
Wet corn	0.15	April — September	7	55
Dry corn	0.66	October — February	10	60
Upo	0.11	February — October	6	132
Tomatoes	0.66	September — March	135	633
Garlic	0.06	October — January	4	182
Patola	0.08	January — October	11	38

On the technicians' advice, LC-LBM made the following adjustments for the crop year 1959-1960 (tables 48 and 49):

(1) The area planted to upland rice was reduced;

(2) One-half of the remaining area devoted to rice was planted with certified seeds of Azucena which had excelled in the earlier trial planting;

(3) The area planted to tomatoes was reduced because of low price expectations;

(4) Two crops of bush sitao were planted during the wet season, and a bigger area was planted during the dry season; and

(5) Planting of garlic, the highest income earner per unit area was increased.

Of the above adjustments, only the reduction of the area for tomatoes proved to be an error. Because of the destruction of tomatoes by a typhoon in the northern province, prices went up. All the other changes, however, more than made up for this error. The yield of the certified rice variety was more than 100 per cent higher than that of the native variety, Dagui. The first crop of bush sitao crops gave the farmers a net income of ₱467. His increased garlic plantin; paid off neatly.

TABLE 48. *Gross crop production per hectare of LC—LBM, 1957-58 to 1961-62*

CROP	AREA PLANTED IN HECTARE					PRODUCTION PER HECTARE				
	1957-58	1958-59	1959-60	1960-61	1961-62	1957-58	1958-59	1959-60	1960-61	1961-62
Wet season										
Upland palay										
Native	1	1.23	.33	.34	.90	36 cavans	60 cavans	45 cavans	56 cavans	66 cavans
Certified, Azucena	—	—	.36	.25	—	—	—	86 cavans	76 cavans	—
Corn-native	—	.15	—	—	—	—	33 cavans	—	—	24
Corn-hybrid	—	—	.15	.25	.25	—	—	40 cavans	60 cavans	—
Corn green	—	—	—	.25	—	—	—	—	16000 ears	—
Bush sitao 1	—	—	.22	.25	.25	—	—	6886 kg.	3900 kg.	6000 kg.
Bush sitao 2	—	—	.23	—	—	—	—	5635 kg.	—	—
Eggplant	—	—	.05	—	—	—	—	6400 pieces	—	—
Mustard	—	—	—	—	.02	—	—	—	—	450 kaings
Dry Season										
Corn-hybrid	—	.66	.51	—	—	—	9 cavans	53 cavans	—	16 cavans
Corn-native	.50	—	—	.15	.25	—	—	—	20 cavans	—
Tomatoes	.50	.66	.24	.50	.85	122 kaings	427 kaings	142 kaings	120 kaings	207 kaings
Garlic	.15	.06	.15	.25	.25	333 braids	1133 braids	920 braids	3200 braids	3400 braids
Corn green hybrid	—	—	.40	—	—	—	—	9000 ears	—	—
Bush sitao	—	—	.33	.25	—	—	—	794 kg.	600 kg.	—
Annual crop										
Upo	—	.11	.11	—	.11	—	191 kaings	109 kaings	—	—
Patola	.11	.08	.08	.11	—	200 kaings	250 kaings	450 kaings	291 kaings	364 kaings

TABLE 49. *Cost and return on the farm of LC-LBM, 1957-58 to 1961-62*

CROP	1957-58			1958-59			1959-60			1960-61			1961-62		
	Gross Receipts	Farm Expenses	Net Returns	Gross Receipts	Farm Expenses	Net Returns	Gross Receipts	Farm Expenses	Net Returns	Gross Receipts	Farm Expenses	Net Returns	Gross Receipts	Farm Expenses	Net Returns
Wet season															
Upland palay	399	220	179	740	353	387	575	293	282	532	121	411	522	233	289
Corn	—	—	—	55	17	38	48	9	39	180	86	94	—	—	—
Eggplant	—	—	—	—	—	—	4	—	4	—	—	—	—	—	—
Bush sitao															
1	—	—	—	—	—	—	522	55	467	218	90	128	—	—	—
2	—	—	—	—	—	—	151	95	56	—	—	—	—	—	—
Green corn	—	—	—	—	—	—	—	—	—	70	28	42	—	—	—
Dry season															
Corn	—	—	—	60	40	20	273	189	84	48	14	34	106	21	85
Tomatoes	408	78	330	634	234	400	538	53	485	1200	507	693	639	207	432
Garlic	75	47	28	182	49	133	396	163	233	615	401	214	144	22	122
Bush sitao	—	—	—	—	—	—	88	49	39	30	54	—24	196	57	139
Green corn	—	—	—	—	—	—	38	29	9	—	—	—	—	—	—
Mustard	—	—	—	—	—	—	—	—	—	—	—	—	102	17	85
Annual crops															
Upo	—	—	—	132	39	93	99	27	72	—	—	—	3	—	3
Patola	300	50	250	38	19	19	114	33	81	113	29	84	429	109	320
Poultry															
Cash and Non-cash	—	—	—	—	—	—	—	—	—	2847	2444	403	2334	1623	711
Livestock															
Cash and Non-cash	99	105	—6	363	63	300	598	193	405	605	689	—84	512	238	274
Total	1281	500	781	2204	814	1390	3444	1188	2256	6458	4463	1995	4987	2527	2460

With his increased income, he liquidated his debts. He obtained a loan from a regular bank to establish a poultry enterprise. He had some bad luck in this enterprise. As his pullets began to lay eggs, the large-scale feed poisoning occurred and his flock was one of the victims. Although he collected reimbursements for his damages, this incident coupled with the fact that poultry competed with his crop enterprises in the use of his time led him to give up this enterprise. He switched his interest to swine which he thought would not demand as much attention as poultry.

The outstanding result in farmer LC-LBM was the change in his personal outlook. He has become more interested in learning new things, seriously attending and participating in farmers' classes. He continues to attend field days in College and other barrios. He has become more analytical.

He is now one of the serious farmer experimenters. He tries some new ideas on his farm, discarding those which he thinks are not worthwhile, adopting those he thinks are profitable; he is forever on the lookout for new things. He has probably made some mistakes, but he has benefited from them. His income has been increasing substantially.

Farmer PC-PDD

Farmer PC-PDD was one of the top earners in his village. During the year preceding the start of the Farm Development Project, he was third among the selected primary cooperators. He gained top position after the first year.

In 1958, PC-PDD was 37 years old. He and his 34-year-old wife had completed four years of grade school. Two of his children and his father composed the household (table 50).

TABLE 50. *The family of PC—PDD, 1958*

FAMILY MEMBERS	AGE	EDUCATIONAL ATTAINMENT
	years	
Operator	37	4th grade
Wife	34	4th grade
Sons 1	16	1st year high school
2	13	5th grade
Daughters 1	18	3rd year high school
2	8	
3	5	
Father	58	

Farmer PC-PDD owned and operated a 2.65-hectare farm. This was near the average of 2.7 hectares in his barrio.

In 1958, he had a few fattening pigs of native breed which were kept in an improved hog pen. He also had a few native chickens. These were not confined and did not receive much attention in terms of care and management (table 51).

TABLE 51. *The farm resources of PC-PDD, April 1958*

FARM RESOURCES	NUMBER	VALUE
Operator		*pesos*
Farm land (hectares)	2.65	12,700.00
Work animal	1	450.00
Swine	5	470.00
Poultry	5	12.00
Tools and equipment	5	67.00
Dwelling	1	1,800.00
Supplies	—	108.00
Total	—	15,607.00

At the start of the project, PC-PDD was primarily a crop farmer. In 1958-59, he had rice and corn in the wet season and five different crops for the dry season. In addition he had three annual crops. This cropping pattern kept him fairly busy throughout the year (table 52).

TABLE 52. *Land use, labor requirement, and income of PC-PDD, April 1958-59*

CROP	AREA PLANTED	MONTH GROWN	LABOR NEEDED	INCOME
Wet season	*hectares*		*man-days*	*pesos*
Upland palay	1.55	January — October	133	557
Corn	.15	February — September	9	100
Dry season				
Corn	1.55	November — February	16	133
Eggplant	.05	July — February	1	19
Tomatoes	.35	September — February	28	428
Garlic	.30	October — January	68	2,685
Annual crop				
Upo	.10	July — December	8	95
Patola	.25	November — September	16	414
Seguidillas	.20	August — January	27	84

The changes that he made in his 1958-1959 operations follow:

(1) Reduction of the area planted to upland rice, corn and upo
(2) Use of hybrid corn seeds
(3) Wider distancing of corn
(4) Increasing areas planted to garlic and tomatoes and
(5) Planting of eggplant and seguidillas.

The biggest benefit from these changes came from garlic. The net returns increased from P43 to P2,554.

The successful readjustments in this crop year helped greatly in building up the confidence of PC-PDD in new ideas. He continued to use hybrid corn seed up to 1960 when he could not get them anymore. He learned and realized the importance of fertilizing citrus with commercial fertilizer and chicken dung. He also learned to spray his mango trees. With the technicians, he tried controlling fruitfly with

TABLE 53. *Gross production of crops per hectare of PC-PDD from 1957-58 to 1961-62*

CROP	AREA PLANTED IN HECTARE					PRODUCTION PER HECTARE				
	1957-58	1958-59	1959-60	1960-61	1961-62	1957-58	1958-59	1959-60	1960-61	1961-62
Wet season										
Palay	1.70	1.56	1.48	1.67	1.50	38 cavans	36 cavans	26 cavans	25 cavans	45 cavans
Corn	.50	.21	.30	.42	—	10 cavans	43 cavans	33 cavans	24 cavans	—
Eggplant	—	.05	—	.04	.25	—	80 kaings	—	100 kaings	348 kaings
Bush sitao	—	—	.20	.10	—	—	—	120 kaings	180 kaings	—
Dry season										
Corn	1.50	1.21	1.11	1.34	.66	1 cavan	10 cavans	19 cavans	22 cavans	27 cavans
Garlic (dried)	.20	.35	.30	.33	.20	100 braids	2040 braids	2313 braids	2000 braids	750 braids
Green garlic	—	.03	.15	.10	.20	—	5267 bundles	2000 bundles	279[illegible] bundles	4000 bundles
Tomatoes	.20	.28	.40	.42	.23	100 kaings	151 kaings	99 kaings	37 kaings	79 kaings
Bush sitao	—	—	.10	—	—	—	—	155 kaings	—	—
Annual crops										
Ampalaya	—	—	.22	—	.14	—	—	141 kaings	—	182 kaings
Upo	.30	.10	—	—	—	167 kaings	295 kaings	—	—	—
Patola	.25	.28	.22	.22	—	500 kaings	348 kaings	216 kaings	273 kaings	—
Seguidillas	—	.20	—	.11	—	—	101 kaings	—	118 kaings	—
Calamansi	—	—	—	.42	.42	—	—	—	100 kaings	119 kaings

TABLE 54. *Cost and returns on the farm of PC-PDD, 1957-58 to 1961-62*

CROP	1957-58			1958-59			1959-60			1960-61			1961-62		
	Gross Receipts	Farm Expenses	Net Returns a/	Gross Receipts	Farm Expenses	Net Returns a/	Gross Receipts	Farm Expenses	Net Returns a/	Gross Receipts	Farm Expenses	Net Returns a/	Gross Receipts	Farm Expenses	Net Returns a/
Wet season															
Upland palay	675	412	263	557	265	292	378	193	185	708	320	388	758	404	354
Corn	71	16	55	100	18	82	100	18	82	75	16	59	—	—	—
Bush sitao	—	—	—	—	—	—	76	76	—	94	27	67	—	—	—
Eggplant	—	—	—	19	2	17	—	—	—	30	2	28	158	18	140
Dry season															
Corn	10	—	10	133	70	63	215	75	140	467	125	342	346	154	192
Garlic	160	117	43	2685	131	2554	925	413	512	462	560	—98	510	86	424
Green garlic	—	—	—	—	—	—	430	325	105	224	181	43	—	—	—
Tomatoes	100	10	90	428	55	373	802	31	771	620	49	571	260	21	239
Bush sitao	—	—	—	—	—	—	72	26	46	—	—	—	164	32	132
Annual crops															
Patola	500	65	435	414	22	392	156	26	130	360	25	335	—	—	—
Ampalaya	—	—	—	53	15	38	189	37	152	—	—	—	408	35	373
Upo	200	47	153	95	5	90	4	—	4	—	—	—	—	—	—
Seguidillas	—	—	—	84	7	77	1	—	1	64	1	63	—	—	—
Pepper	—	—	—	6	—	6	—	—	—	—	—	—	—	—	—
Calamansi	—	—	—	62	25	37	20	4	16	210	124	86	260	32	228
Mango	42	5	37	—	—	—	125	24	101	—	—	—	—	—	—
Poultry															
Cash and non-cash	—	—	—	—	—	—	2651	2278	376	8462	5100	3362	7355	588	6767
Pig															
Cash and non-cash	647	247	400	1118	628	489	599	404	195	682	270	412	585	365	220
Total	2405	919	1486	5754	1243	4510	6743	3930	2816	12458	6800	5658	10804	1735	9060

a/ Net returns to family-furnished labor, capital and management.

plastic bags to cover the fruits. He got used to changing his plans in accordance with price expectations. He searched for new practices or ideas. Some of these are reflected in his cropping pattern (table 53).

His most important preoccupation, however, was poultry. After he had made money on garlic, he built a 150-layer-capacity poultry house, worth P365 in March, 1959. In the same month, he bought three hatches of chicks, totalling 624 and costing P300.

In September, 1959, he obtained a loan of P600 to expand his poultry enterprise. He built another 200-layer-capacity poultry house and brooder. Although the new house had twice the capacity of the first, the cost of P275 was much less. The explanation was in the materials used. Against the recommendation of the technicians, the farmer used galvanized-iron sheets to roof the first house. He reasoned that if he failed in poultry, he could store his crops in the house.

On the completion of the second poultry house and brooder, he bought 200 sexed White Leghorn chicks for P200.

In early 1960, he bought a 200-egg-capacity kerosene incubator. In March of the same year, he built another poultry house with a capacity of 240 layers. This house was designed so that a second unit could be added to double the capacity. A few months later, he bought another kerosene incubator with an egg capacity of 500 because he planned to go seriously into the poultry business. With his poultry business in high gear, he added the second unit to his poultry house.

As shown in table 54, this farmer has gone more and more into his poultry enterprise. However, he has not neglected his crop and swine enterprises. He continues to take active interest in managing the crop enterprises although his father has taken over much of the responsibility of implementing the plans. In the swine enterprise, the business has expanded from the common scheme of fattening pigs. In 1962, he built a three-compartment hog pen to house, among others, a sow.

Farmer PJ-PFC

Farmer PJ-PFC may represent upland farmers who have some diversified crops and can incorporate swine enterprises in the farm business. An owner-operator, PJ-PFC may be considered average in industry but very curious about new ideas and eager to improve. The changes that he made on the farm were so rewarding that he became one of the top farmers in his barrio.

In 1958, PJ-PFC was 36 years old. He finished three years in grade school while his 34-year-old wife finished four. One son and one daughter were in school. Another young child and the parents of the wife lived with the farm family (table 55).

TABLE 55. *The family of PJ—PFC, 1958*

FAMILY MEMBER	AGE	EDUCATIONAL ATTAINMENT
	years	
Operator	36	3rd grade
Wife	34	4th grade
Sons 1	11	3rd grade
2	5	—
Daughter	8	2nd grade
Mother-in-law	58	none
Father-in-law	59	none

Farmer PJ-PFC operated a 2.34-hectare diversified crop farm. The average in his barrio was 2.9 hectares. In 1958, he had more chickens than the average farmer. They were native or mongrel breeds and were not confined. He also had three native pigs which were managed the usual way, either let loose or tethered in the yard (table 56).

TABLE 56. *The farm resources of PJ-PFC, 1958*

FARM RESOURCES	NUMBER	VALUE
Operator		*pesos*
Farm land (hectares)	2.34	20,250
Work animal	1	300
Swine	3	125
Poultry	32	49
Tools and equipment	6	148
Dwelling	1	3,000
Supplies	—	69
Total		23,941

At the start of the farm development study, PJ-PFC had already planted his wet season crops for the crop year 1958-1959. He, however, showed much interest in the field trial of eight recommended upland rice varieties conducted on another farmer's field.

The following dry season he planted four gantas of hybrid corn. Results of a trial on another farmer's field helped convince PJ-PFC of the superiority of hybrid over the native open-pollinated corn. He requested the technicians to buy the rights seeds for him. In addition, he tried applying all the required fertilizers at planting time. Previously he had been using the split method which was good only for the wet season and for widely spaced planting. He readily accepted innovations like chemical control of storage pests: treatment of gunny sacks for storing corn and dipping garlic bulbs in chemical solution.

Farmer PJ-PFC did not have as many different crops as some of the other upland farmers, but his farm was more diversified than that of most lowland rice farmers (table 57).

TABLE 57. *Land utilization, timing, labor requirement and income from crops of PJ-PFC, 1958-59*

CROP	AREA PLANTED	MONTHS GROWN	LABOR NEEDED	INCOME[a]
	hectares		*man-days*	*pesos*
Wet				
Upland palay	1.75	March-October	69	571
Corn	.32	March-September	34	20
Dry				
Corn	.49	October-February	88	210
Tomatoes	.92	October-March	34	100
Garlic	.03	October-February	9	60
Calamansi	.19	September-January	6	20

Returns to family-furnished labor, capital, and management.

In 1958-59, the first improvements in his livestock raising were made. First was the confinement of the pigs in an improvised pen of old hog wire, bamboo, and nipa shingles. This was closely followed with vaccination against hog cholera and swine plague. Of the three pigs, one gilt was marked as a sow and two were fattened for sale. The gilt was artificially inseminated with Duroc-Jersey semen to improve the stock.

More changes were made in the following crop year, 1959-1960. One cavan of the recommended rice variety, Azucena, was planted. This variety was one of the two that gave yield which was superior to those of the native varieties in the earlier field trial of a neighboring farmer. In addition, one ganta of hybrid corn was planted and small parcels of bush sitao and eggplants were tried out.

The following dry season, hybrid corn seeds were used. Bush sitao and garlic plantings were expanded after the favorable results obtained earlier. The area planted to tomatoes was reduced because of low price expectations.

In the succeeding years, the important new practices were carried over. Most notable of these are the use of seeds of recommended rice varieties, the use of new hybrid corn seeds, the adjustment of cropping areas in line with price expectations, and the different cultural and storage practices (table 58).

The livestock project has steadily developed. In early 1960, after the sale of the two fattened pigs, a three-compartment hog house was built with durable materials such as concrete for flooring, lumber for framework, hollow blocks for walls, and galvanized iron sheets for the roof. Meanwhile, all other management practices such as feeding, sanitation, and immunization were improved.

TABLE 58. *Crop production on the farm of PJ-PEC, 1957-1958 to 1961-1962*

CROP	AREA PLANTED IN HECTARES 1957-58	1958-59	1959-60	1960-61	1961-62	PRODUCTION PER HECTARE a/ 1957-58	1958-59	1959-60	1960-61	1961-62
Wet season										
Palay	1.	1.74	1.09	1.34	1.34	28 cavans	33 cavans	76 cavans	45 cavans	56 cavans
Corn	—	.32	.30	.32	.32	—	6 cavans	27 cavans	31 cavans	16 cavans
Bush sitao	—	—	.08	.16	.16	—	—	12 gantas 700 bundles	5281 bundles	15065 bundles
Eggplant	—	—	.38	—	.16	—	—	307 kaings	—	138 kaings
Dry Season										
Corn	1	.49	.49	.70	.75	5 cavans	43 cavans	20 cavans	46 cavans	20 cavans
Bush sitao	—	—	.15	.20	.20	—	—	2100 bundles	4065 bundles	15845 bundles
Garlic	.25	.30	.25	.15	.15	600/unit	1500 braids	1268 braids	2667 braids	1435 braids
Tomatoes	.30	1.22	.45	.68	.68	33 kaings	22 kaings	68 kaings	18 kaings	72 kaings
Annual crops										
Calamansi	.19	.19	.19	.19	.19	3 kaings	17 kaings	36 kaings	95 kaings	69 kaings
Citrus	—	—	.28	.29	.28	—	—	229 kaings	178 kaings	535 kaings
Upo	—	—	.25	—	—	—	—	98 kaings	—	— kaings

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[a] Equivalents of unit measures are:

1 *Cavan* — 25 gantas or 75 liters (rough rice — 44 kilograms).
1 *Braid* — 100 heads of garlic.
1 *Ganta* — 3 liters.
1 *Bundle* — approximately, 100 pods to a bundle.
1 *Kaing* — a basket with an approximate volume capacity of a bushel.

TABLE 59. *Cost and returns on the farm of PJ-PFC, 1957-1958 to 1961-1962*

CROP	1957-58			1958-59			1959-60			1960-61			1961-62		
	Gross Receipts	Farm Expenses	Net Returns a/	Gross Receipts	Farm Expenses	Net Returns a/	Gross Receipts	Farm Expenses	Net Returns a/	Groos Receipts	Farm Expenses	Net Returns a/	Gross Receipts	Farm Expenses	Net Returns a/
Wet season															
Upland palay	313	87	226	571	143	428	823	308	515	723	217	506	1058	414	644
Corn	—	—	—	16	18	—2	65	18	47	180	20	160	60	28	32
Bush sitao	—	—	—	—	—	—	68	8	20	80	39	41	208	77	131
Eggplant	—	—	—	—	—	—	365	45	320	—	—	—	72	22	50
Dry season															
Corn	25	57	—32	231	53	178	80	59	21	512	108	404	180	73	107
Bush sitao	—	—	—	—	—	—	158	49	109	270	63	207	295	73	222
Garlic	200	124	76	163	40	123	1036	185	851	320	319	1	323	96	227
Tomatoes	50	20	30	112	29	83	711	110	601	211	35	176	544	81	463
Ginger	—	—	—	—	—	—	—	—	—	7	—	7	—	—	—
Annual Crop															
Calamansi	25	5	20	20	16	4	72	64	8	137	2	135	91	5	86
Citrus	—	—	—	—	16	—16	204	—	204	63	—	63	88	—	88
Upo	—	—	—	—	—	—	—	—	—	219	26	193	—	—	—
Nangka	—	—	—	—	—	—	7	1	6	34	—	34	—	—	—
Abocado	—	—	—	—	—	—	9	1	8	—	—	—	10	—	10
Siniguelas	—	—	—	—	—	—	3	—	3	—	—	—	—	—	—
Atis	—	—	—	—	—	—	6	1	5	—	—	—	—	—	—
Livestock															
Non-cash	140	24	116	195	30	165	226	85	141	535	298	237	597	385	212
Cash	—	76	—76	410	45	295	88	104	—16	339	562	—223	1149	744	405
Total	753	393	360	1718	460	1258	3881	1038	2843	3630	1689	1941	4675	1998	2677

a/ Net returns to family-furnished labor, capital, and management.

Of the five piglets that were the results of artificial insemination, two were sold, one was kept for fattening, and two females were kept for breeding.

In December, 1960, another compartment was added to the hog houses. This was a much needed expansion because PJ-PFC had decided to enlarge his swine enterprise. The two gilts farrowed with a much improved grade of litters. The weanlings brought a high price.

In the summer of 1961, two more compartments were added. The completion of the barrio water system facilitated the cleaning of the hog pens.

In early 1963, PJ-PFC bought a purebred Duroc-Jersey boar costing ₱450. Although he got it mainly to service his own sows, he also used it to service other sows at a fee.

In terms of returns, establishing a livestock enterprise is different from making changes on short-season crops. It takes some time before the capital investment is fully paid. Throughout the three years, the net returns of the swine enterprise of PJ-PFC fluctuated at a low level mainly because of the build-up of stocks. It was only in the fourth year that he obtained a relatively high net return (table 59).

GROUP OBSERVATION

The results of the Pilot Study on farming in the project barrios may be seen better in a study of a group of farmers, in addition to the earlier close-up study of individual enterprises, practices, or farm cases. The following discussion covers the general changes in farm organization, practices, farm business expenditures, and returns of primary cooperators and of other farmers for whom data were available, either from records kept or from survey questionnaires.

Changes in Farm Organization

Changes in farm organization were registered. Some items of investments were increased. Land was taken from one crop for another. More enterprises, e.g., livestock and poultry, were incorporated in the farm business.

Capital investment. Land continued to be the most expensive item among 29 primary cooperators in the four pilot barrios (Cale, 7; Janopol, 4; Halang, 10; and Linga, 8). There were little increases in working and operating capital, especially in productive stock of poultry and swine. This is most clearly seen in Barrio Janopol (fig. 9).

Land use. The biggest portion of the land continued to be planted to the staple crops, rice and corn. However, in the upland barrios, Cale and Janopol, plantings of short-season cash crops, such as eggplants, tomatoes, garlic, cucurbits, and other trellis crops, bush sitao, and root-

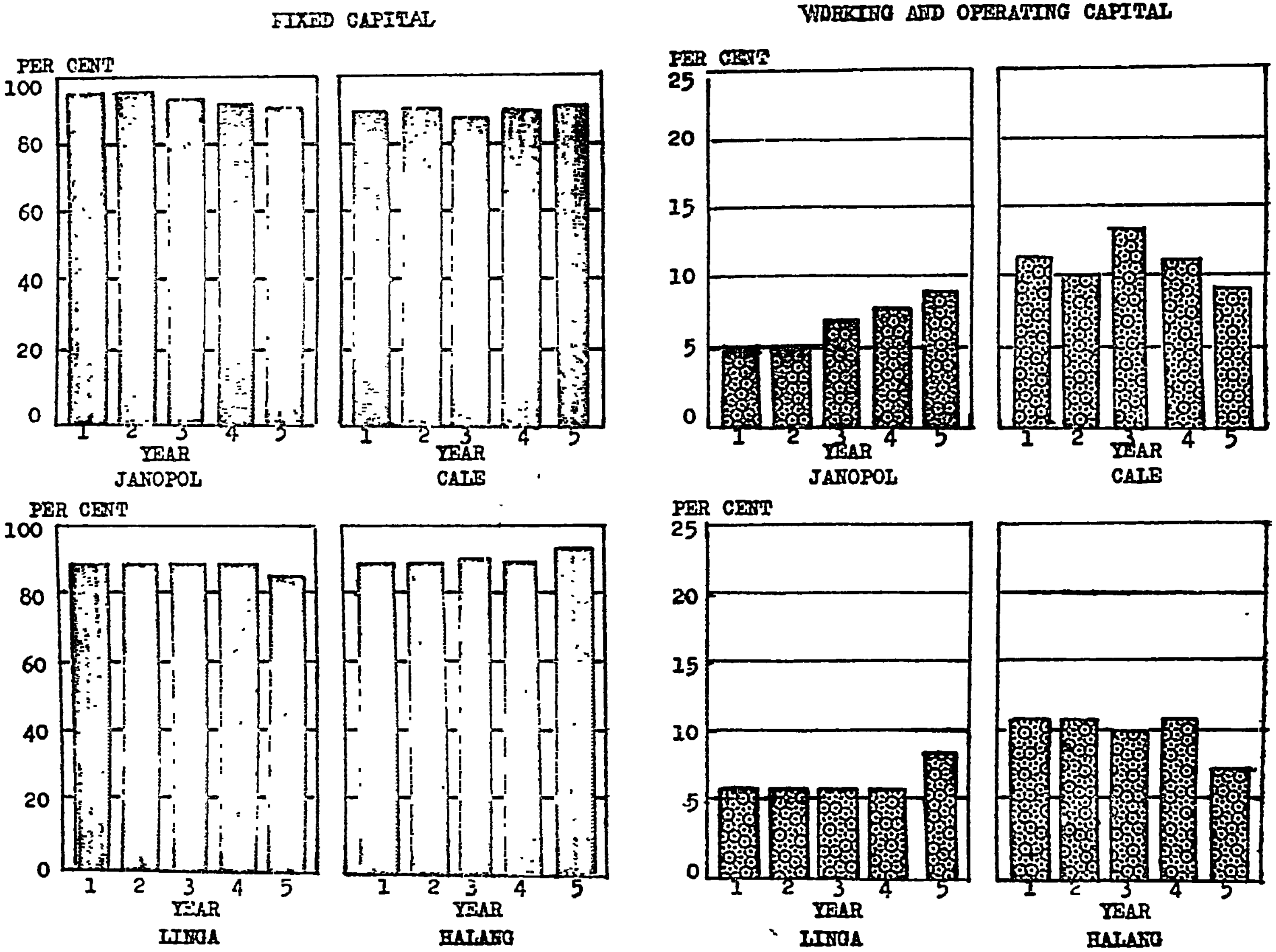


Fig. 9. - Capital investment.

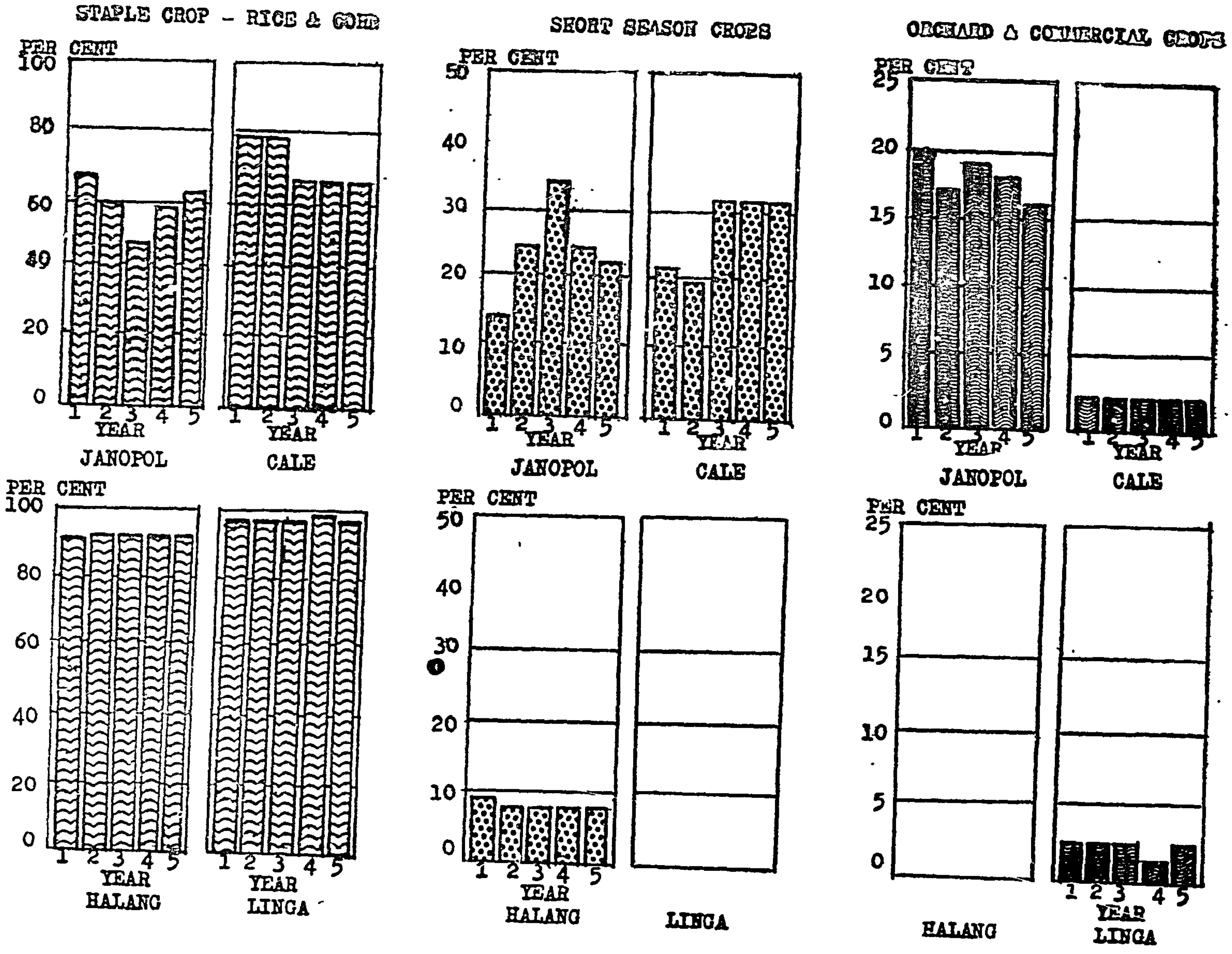


Fig. 10. - Land Use.

crops were increased. Thus, the proportion of land devoted to staple and orchard crops decreased slightly (fig. 10).

Changes in Practices

The difficulty of describing the specific recommendations given to farmers and the general adoption of such practices by farmers have been mentioned earlier.

Using the list of practices reported in the earlier section, Specific Recommendations, the technicians interviewed all full-time farmers in the four pilot barrios. The interviewer recorded whether the specific practice listed in the survey schedule was followed at the time of interview, a year, two, three, or four years ago.

Considering the heterogeneity of conditions in the pilot barrios, it was not surprising to find a wide range in the number and rate of adoption of improved practices. Even during the start of the project in 1957-1958, Halang farmers who were primarily lowland rice growers were trying only an average of three improved practices. In contrast, Linga, Cale, and Janopol farmers who practiced more diversified farming, averaged with seven, 10 and 12, respectivel^ (table 60).

TABLE 60. *Number of improved practices tried by 275 farmers in pilot barrios, 1957-62*

BARRIO	1957-58	1958-59	1959-60	1960-61	1961-62
		number of practices per farmer			
Halang	3	5	6	6	7
Linga	7	8	9	10	11
Cale	11	12	14	15	16
Janopol	12	14	18	19	20

Along with the difference in the number of adopted improved practices at the start of the study, the difference in the rate of adoption was also significant. Halang farmers went up from three to seven practices in five years; those in Linga, from seven to 11; those in Cale from 11 to 16; and those in Janopol, from 12 to 20.

Finally, the difference in the absolute number and the rate of adoption between primary cooperators and other farmers was highly significant. Primary cooperators were always ahead of the other farmers in adopting improved practices. Nevertheless, the other farmers particularly in Janopol, followed closely, probably after extensive direct contacts with the farm development technicians and indirect contacts with the primary cooperators (table 61).

TABLE 61. *Number of improved practices implemented by primary cooperators and other farmers in the pilot barrios, 1957-1962*

ITEM	1957-58	1958-59	1959-60	1960-61	1961-62
	number of practices per farmer				
Halang					
Primary cooperator	5	8	10	10	10
Other farmers	3	4	5	6	6
Linga					
Primary cooperator	10	12	14	16	15
Other farmers	6	7	8	9	9
Cale					
Primary cooperator	13	20	23	24	24
Other farmers	10	12	14	15	15
Janopol					
Primary cooperator	13	17	22	24	21
Other farmers	12	14	17	18	20

Changes in the Farm Business

The amount and combination of the different factors of production are reflected in the summary of the farm business. Any change in these factors, the farm organization, operation or even the detailed farm practices, would normally be expected to bring about changes in the farm business.

Receipts, expenses, and net earnings. The farm business of primary cooperators who had kept complete records showed a general increase in receipts, expenses, and net earnings.

Although expenses increased, because of greater increases in gross receipts, net earnings still increased. Expenses increased during the third year of study, 1960-61, because of the major expansion in the livestock enterprises, particularly in Cale and Janopol. Since it would take time for livestock enterprises to pay, a general decrease in net earnings was recorded (fig. 11).

Net earnings of primary cooperators and other farmers compared. In the benchmark survey of the crop year 1957-1958, the income of primary cooperators was only slightly higher than the average for all other farmers, except in Barrio Cale where it was distinctly higher. The difference in income between these two groups became more apparent four years later. This illustrates how much improvement the primary cooperators were able to make (fig. 12).

Proportion of crop and livestock contribution to gross farm production. The increasing proportion of the livestock contribution was very marked in Barrios Cale and Janopol. Barrio Linga, which already had

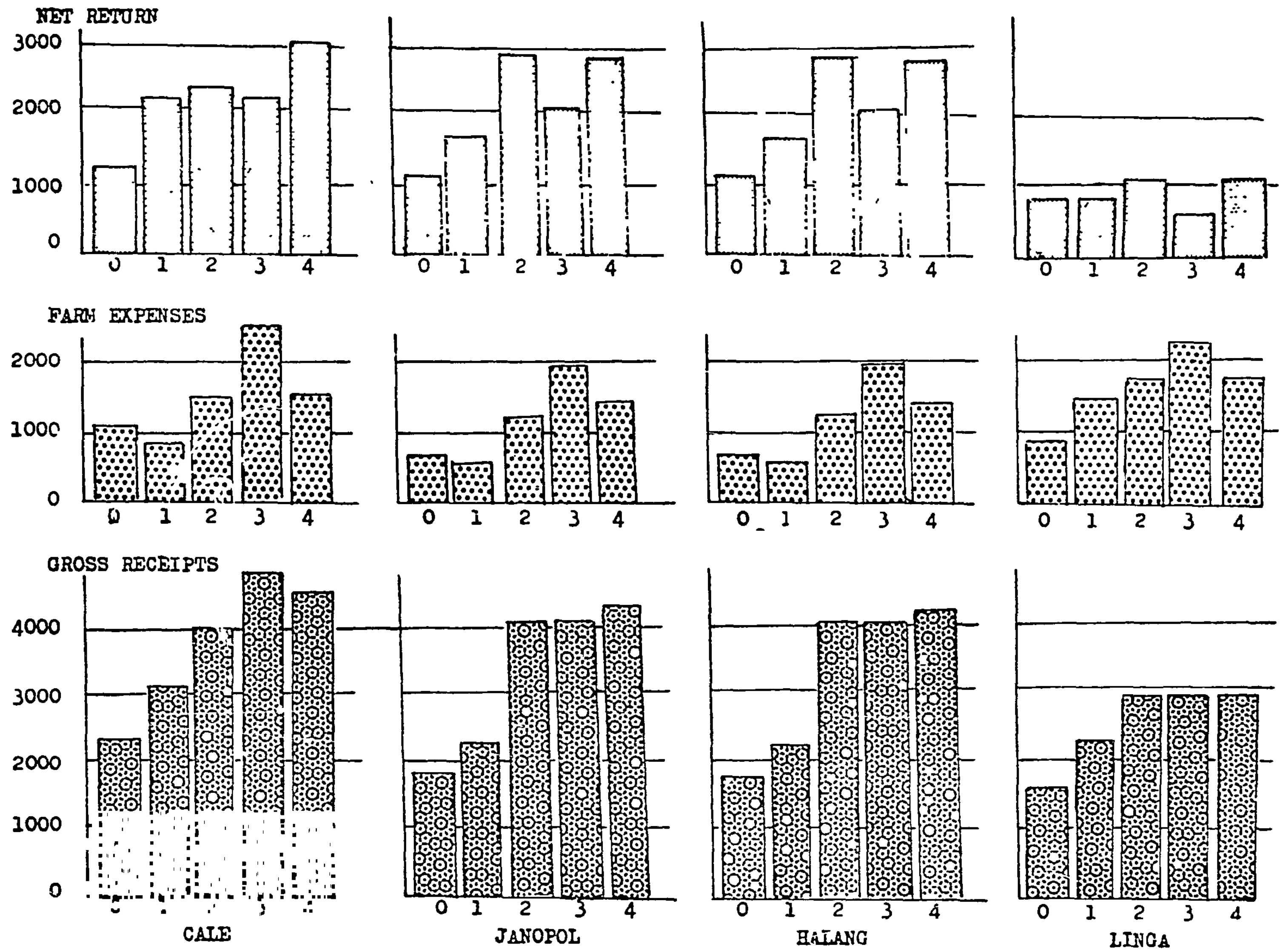


Fig. 11.—Gross receipts, farm expenses and net returns.

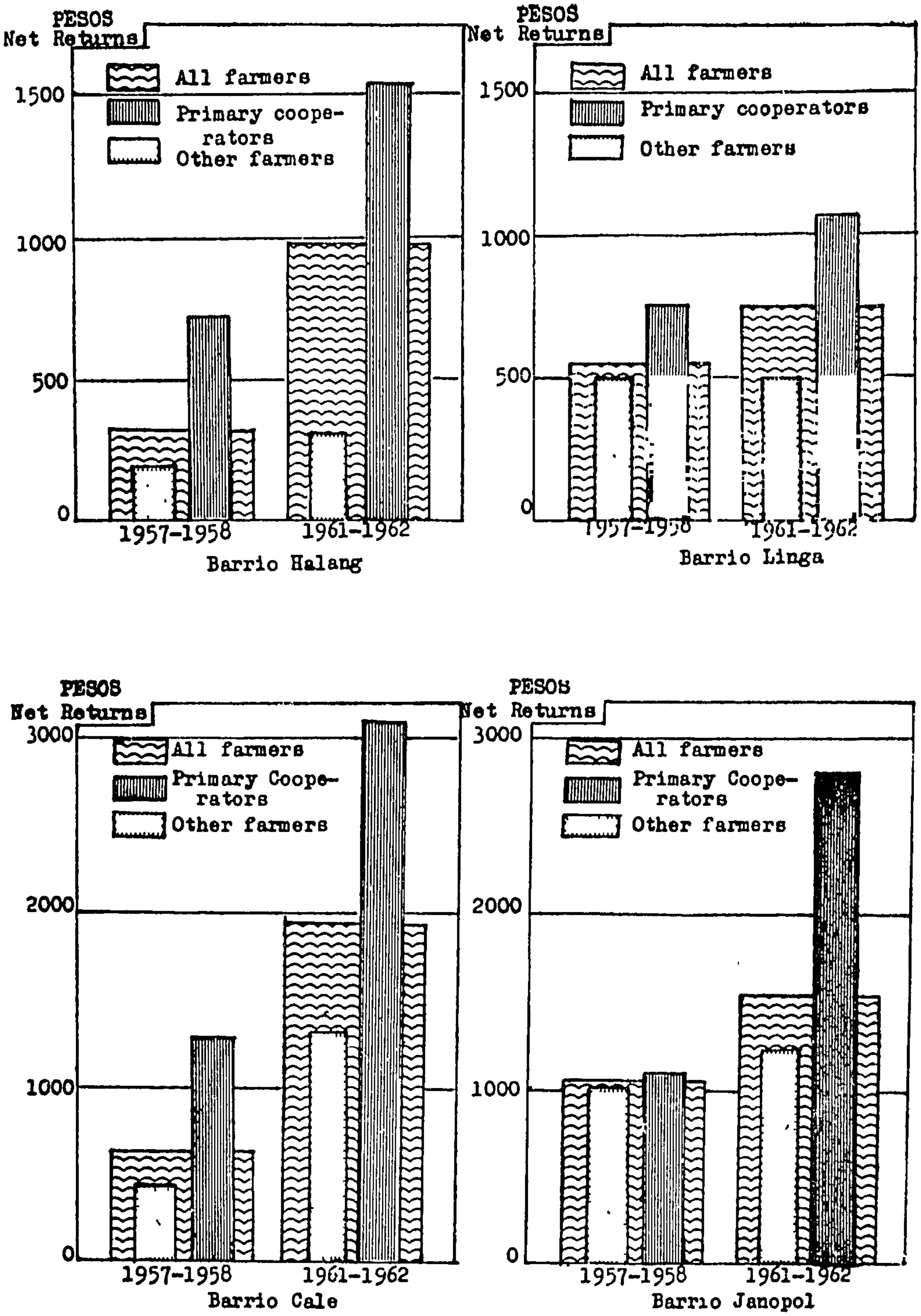
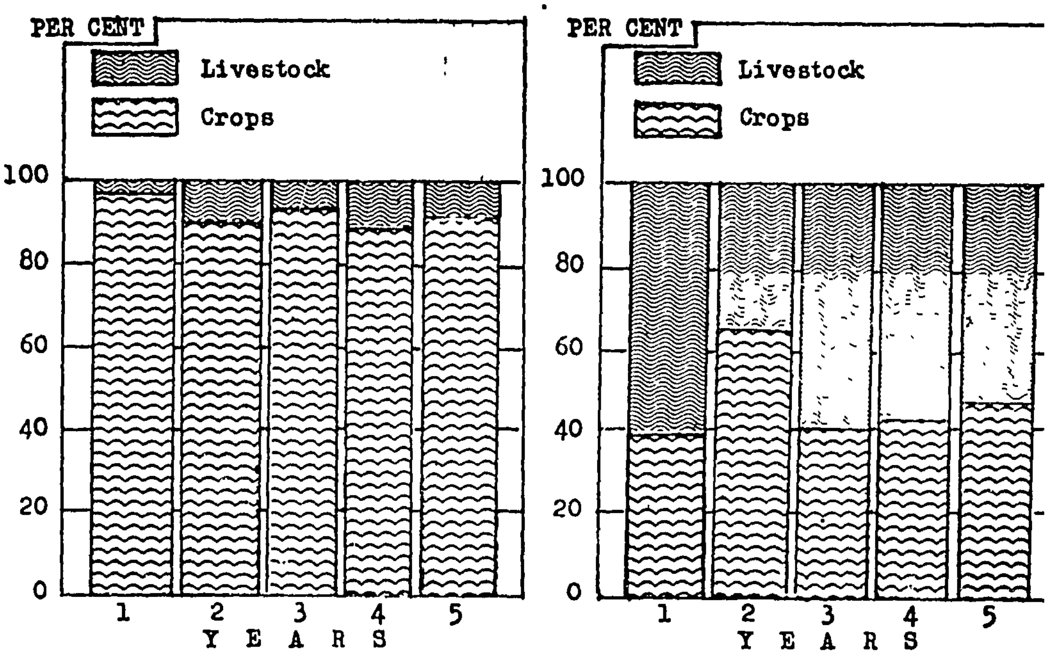
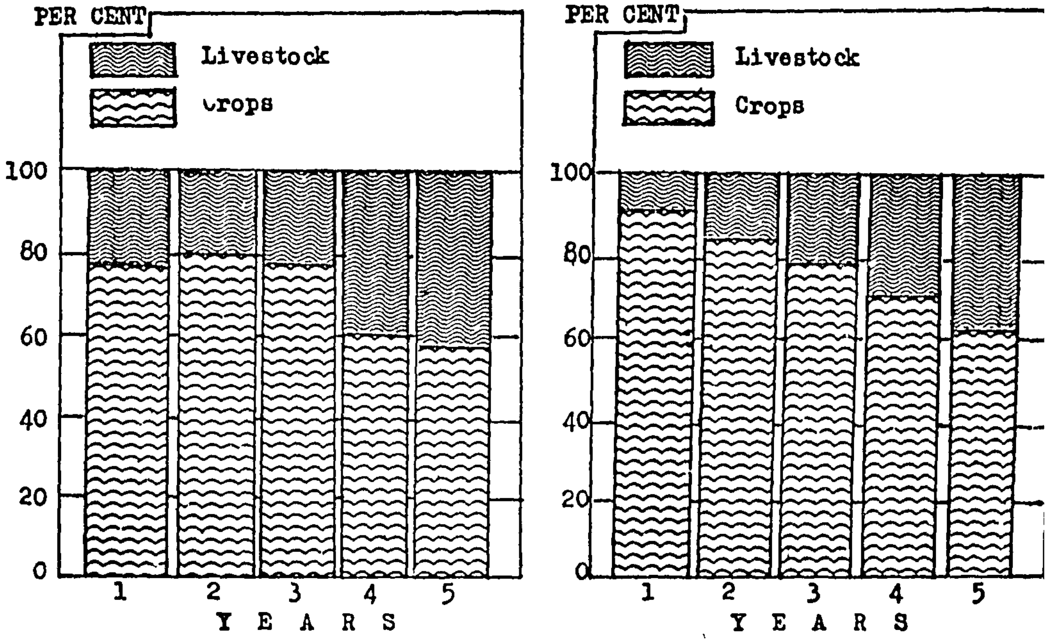


Fig. 12. - Comparison of net returns of primary cooperators and other farmers.



Barrio Halang

Barrio Linga



Barrio Cale

Barrio Janopol

Fig. 13. - Proportion of crop and livestock contribution to gross farm production.

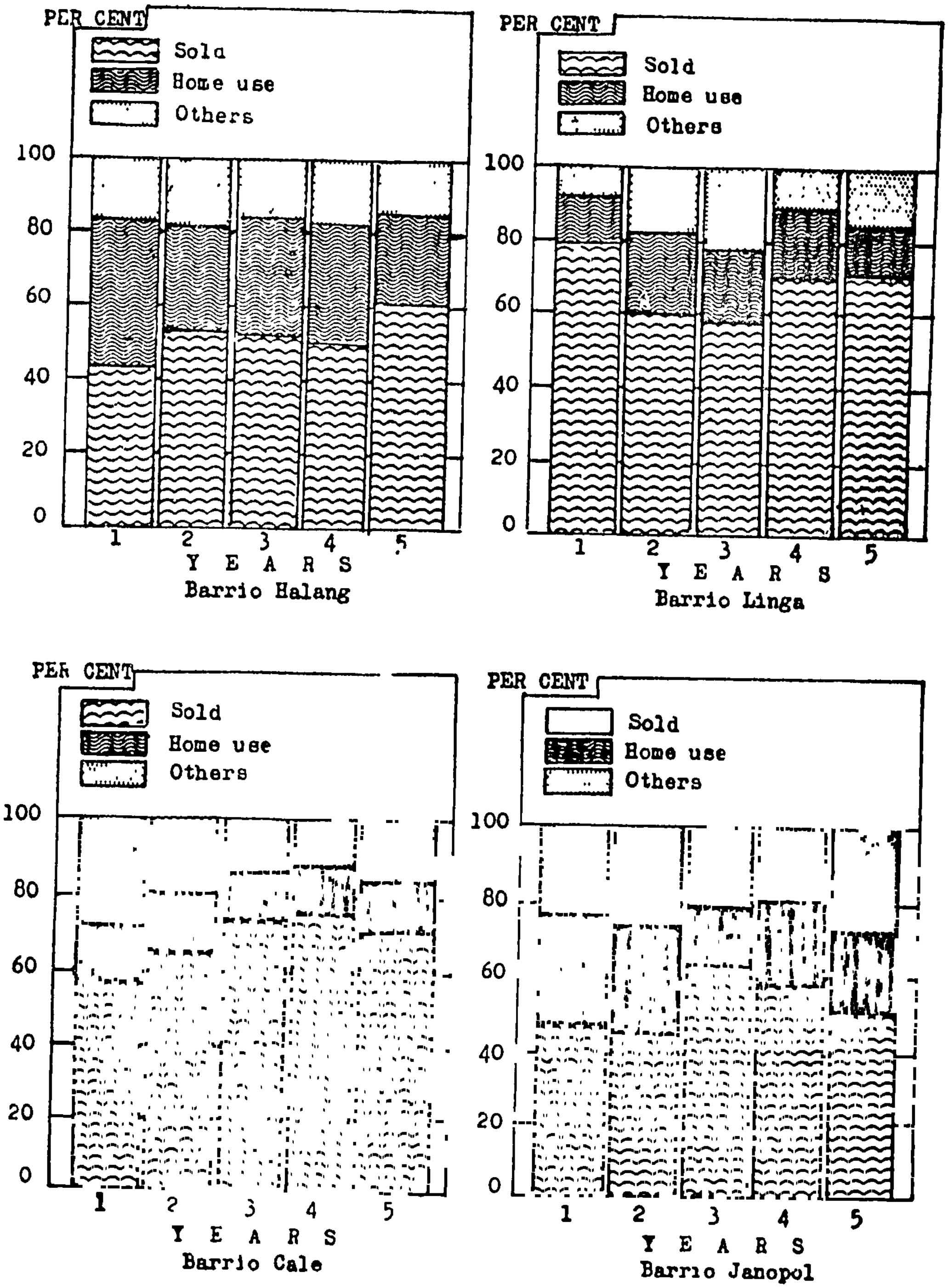


Fig. 14. Proportion of farm family disposable production going to the market.

a high proportion of incomes from livestock registered a slight decrease. This was due to the decrease in duck population which in turn was due to the decreasing snail population which is used as feed for ducks. In Barrio Halang, only two farmers went into commercial poultry and four into swine enterprises. Generally the direction of farm organization was encouraged towards balanced crop and livestock farming. Only Halang still has an agriculture of rice, rice, rice, and a few chickens and fewer hogs on the side (fig. 13).

Proportion of farm family disposable production going to the market. When farmers grow staple crops that are barely enough for family consumption, only a very small part of the farm production passes through the market to the consumer. Most of the produce goes straight to the kitchen. However, when more commercial crops, e.g., vegetables and livestock, are incorporated in the farm business, a greater proportion of the total farm produce can be channeled to the market.

This is clearly illustrated in figure 14. Barrio Halang has continued to be an almost purely rice area. Its income has not increased much. Most of the produce finds its way directly to the farmer's own kitchen. On the other hand, Barrios Janopol, Cale, and Linga have shown a trend towards more market economy.

Variation among farms. Variation in incomes from farm to farm is illustrated very well by the primary cooperators in the four pilot barrios (figs. 15-18).

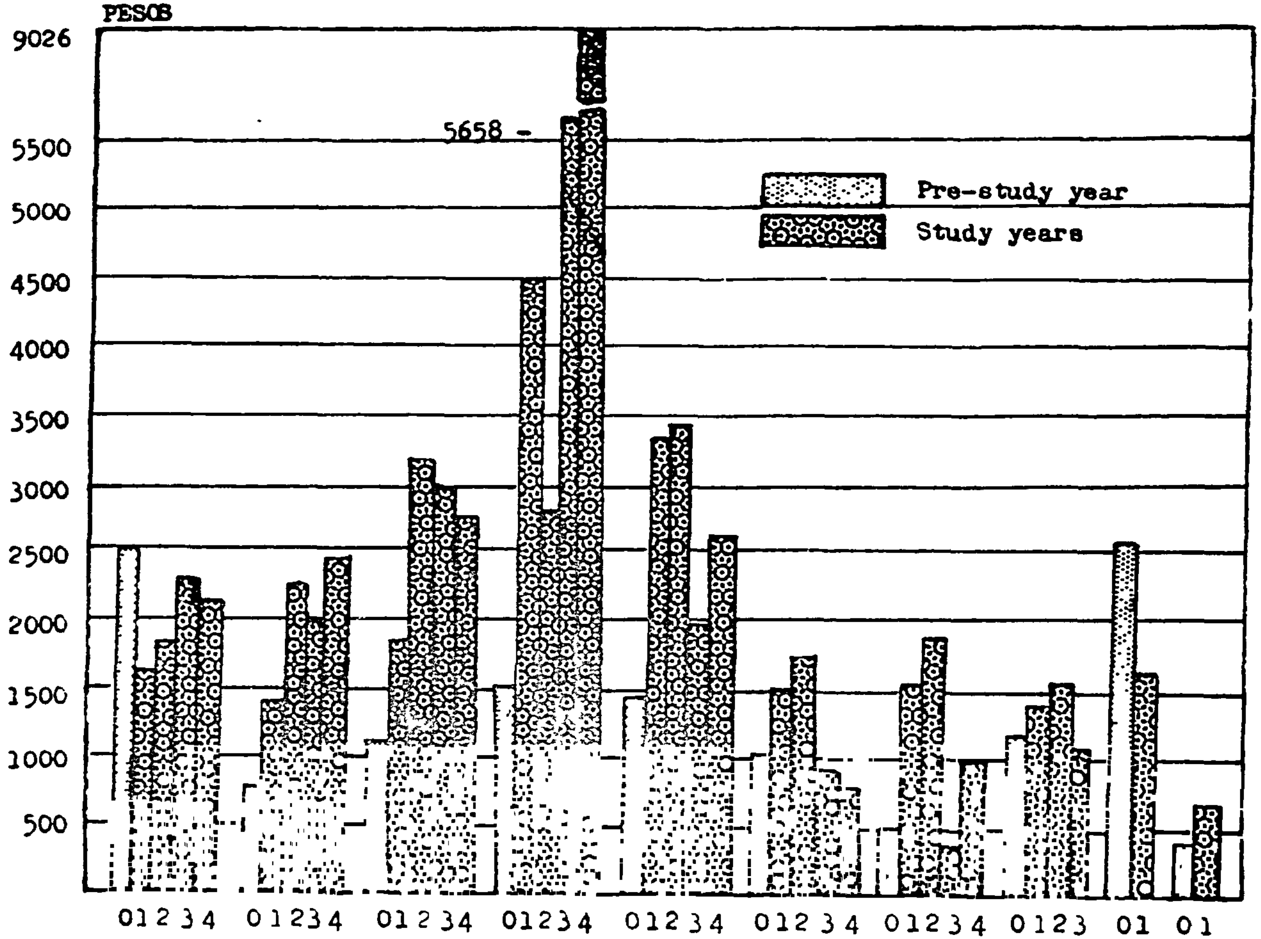
An additional significant observation is derived from the data: a big number of practices or enterprises do not necessarily mean higher incomes. A farmer may have only one or two enterprises. If he manages these well, he may be better off than another farmer who mismanages 10 enterprises. Farmers BH-BFF and EH-EJD illustrate this observation.

CONSOLIDATION OF LESSONS GAINED

The experience in the Pilot Study confirms many observations reported elsewhere. Of course variants are not surprising.

The Focus of Development Work

The central factor of farm production is the farmer. Land, water, machinery, workstock, crops, and livestock all have their basic physical and biological properties which control their contribution to production. The farmer has his own controls. He may stimulate or suppress the natural effects of the different factors of production by adjustments in each factor, in timing, and in other ways. It is obvious that development work must focus attention on the farmer.

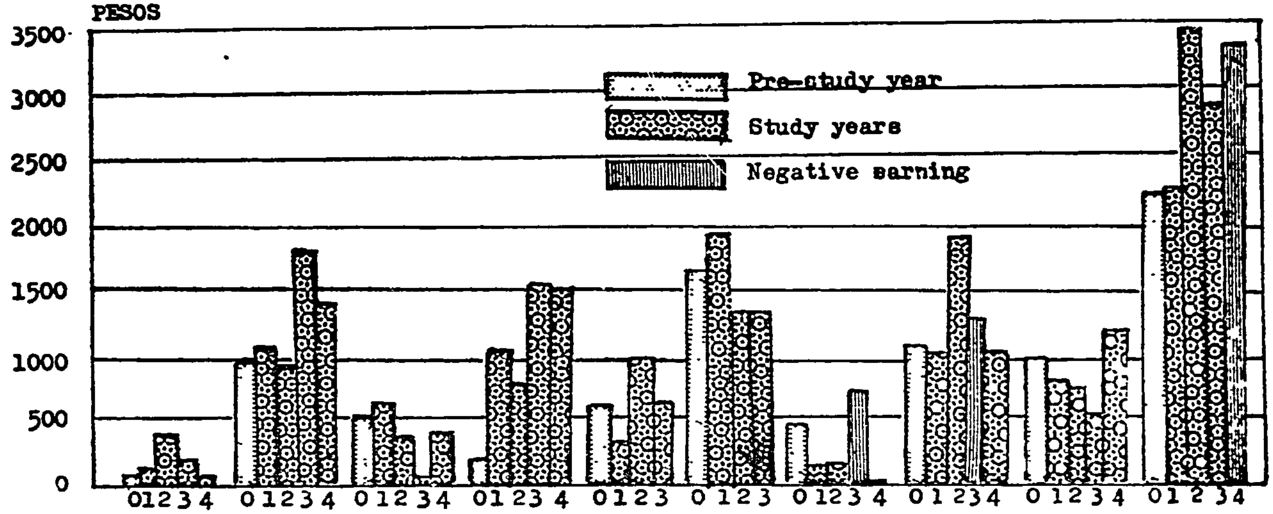


	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4
No. of new practices	-	11	13	11	12	-	8	18	19	20	-	3	3	3	4
No. of new enterprises	-	-	4	1	2	-	2	5	4	4	-	2	4	4	4
No. of all enterprises	7	7	11	9	9	5	7	12	11	9	9	9	14	13	8
CODE - - - - -	FC-FAM					LC-LBM					LC-LCM				
Tenure - - - -	PO					PO					O				

	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4
No. of new practices	-	16	16	16	17	-	2	6	6	10	-	1	1	3	4
No. of new enterprises	-	4	4	4	3	-	3	7	5	5	-	3	4	3	4
No. of all enterprises	8	12	12	12	7	4	7	11	9	9	4	6	9	8	7
CODE - - - - -	PC-PDL					EC-EED					OC-OFM				
Tenure - - - -	O					O					PO				

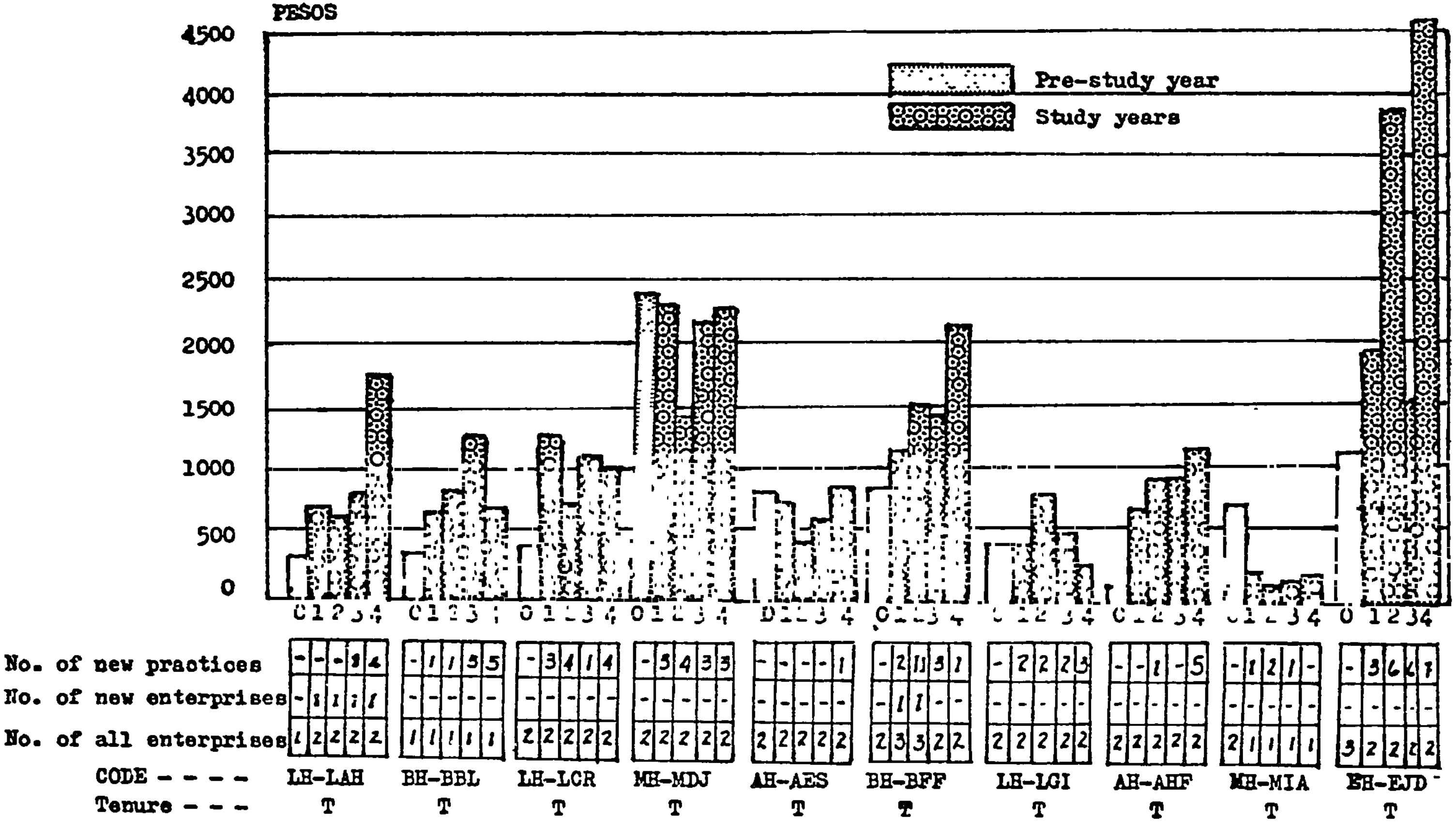
	0	1	2	3	4	0	1	2	3	0	1	0	1
No. of new practices	-	6	10	4	15	-	2	1	4	-	7	-	2
No. of new enterprises	-	4	4	5	5	-	3	4	2	-	2	-	3
No. of all enterprises	4	8	8	9	7	6	9	9	6	8	9	6	8
CODE - - - - -	LC-LGV					LC-LHP				MC-MIM		MC-MJG	
Tenure - - - -	O					PO				PO		T	

Fig. 15. — Net earning to family-furnished labor, land, capital and management, primary cooperators, Barrio Cale Batangas, Philippines, 1957-1962.



No. of New Practices	- - - 2 2	- 1 2 4 1	- 2 4 1 1	- 16 16 16 17	- 1 2 2	- - - 10	- - 4 3 -	- 6 8 9 8	- 2 6 5 4	- - 3 3 3
No. of New Enterprises	- - - - -	- 1 1 2 1	- - 1 1 -	- 4 4 4 3	- - 1 2	- - - 1	- - - -	- - - 1 1	- - - 1 1	- - - 2 -
No. of All Enterprises	1 1 1 1 1	1 2 2 3 2	1 1 2 2 1	9 12 12 12 7	2 1 2 3	1 1 1 2	2 2 2 1 1	3 2 2 5 3	5 2 2 3 3	2 2 2 4 2
CODE - - - - - -	AL-AAG	DL-DBV	CL-CCC	JL-JDD	JL-JEG	VL-VFA	CL-CGP	AL-AHG	SL-SIJ	AL-AJC
Tenure - - - - -	T	PO	T	PO	T	✓ T	T	PO	T	PO

Fig. 16.—Net earnings to family-furnished labor, land, capital and management, primary cooperators, Barrio Janopol, Batangas, Philippines 1957-1962.

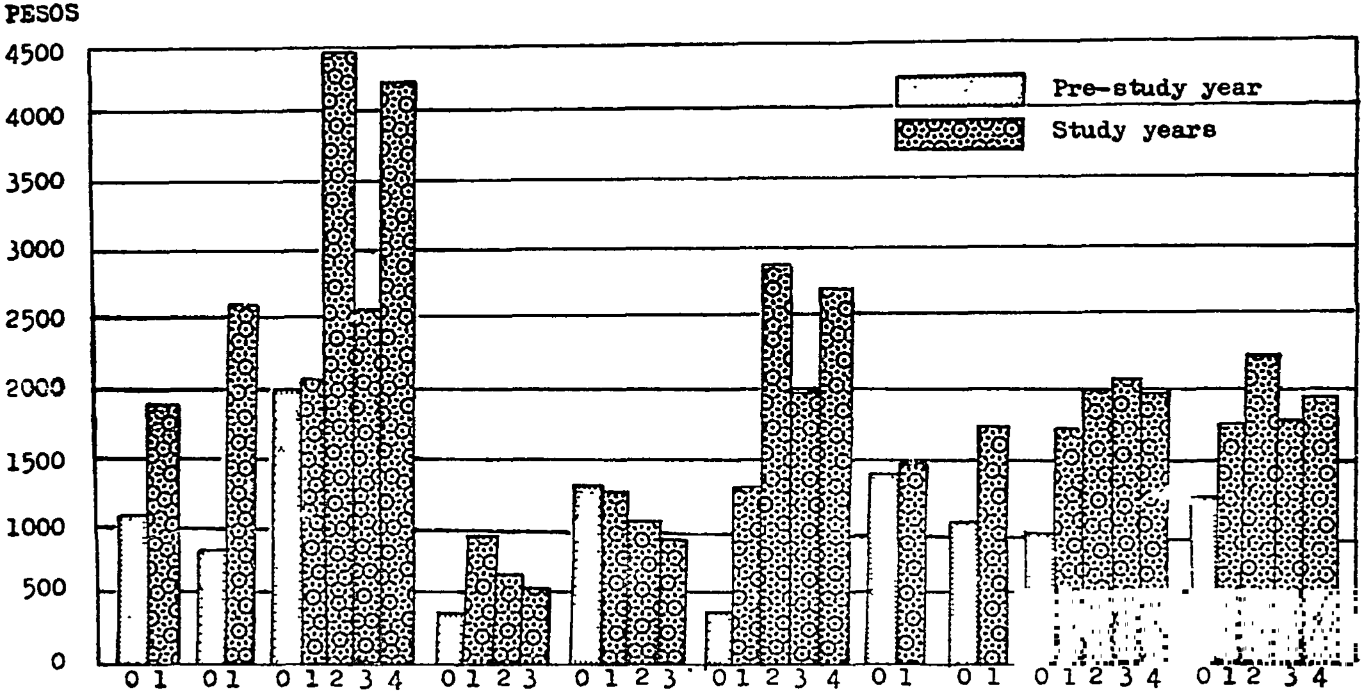


	LH-LAH					BH-BBL					LH-LCR					MH-MDJ					AH-AES					BH-BFF					LH-LGI					AH-AHF					MH-MIA					EH-EJD				
No. of new practices	-	-	-	1	4	-	1	1	5	5	-	3	4	1	4	-	5	4	3	3	-	-	-	-	1	-	2	11	3	1	-	2	2	2	3	-	-	1	-	5	-	1	2	1	-	-	3	6	6	7
No. of new enterprises	-	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
No. of all enterprises	1	2	2	2	2	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	3	2	2	2	2

CODE – – – – LH-LAH BH-BBL LH-LCR MH-MDJ AH-AES BH-BFF LH-LGI AH-AHF MH-MIA EH-EJD

Tenure – – – T T T T T T T T T T

Fig. 17.—Net earnings to family-furnished labor, land, capital and management, primary cooperators, Barrio Halang, Laguna, Philippines, 1957-1962.



	0	1	0	1	0	1	2	3	4	0	1	2	3
New practices	-	9	-	5	1	3	3	14	17	-	2	3	3
New enterprises	-	1	-	2	-	-	2	4	3	-	1	1	1
all enterprises	5	6	7	7	8	7	9	11	11	4	6	6	6
CODE - - - -	EJ-EAC		MJ-MBS		MJ-MCJ					PJ-PDC			
Tenure - - -	O		PO		O					T			

	0	1	2	3	0	1	2	3	4	0	1	0	1
New practices	-	7	18	18	-	6	15	15	17	-	4	-	6
New enterprises	-	-	-	1	-	3	3	3	3	-	1	-	1
all enterprises	7	6	7	6	6	7	10	10	10	6	7	8	9
CODE - - - -	PJ-PEP				PJ-PFC					TJ-TGC		TJ-THD	
Tenure - - -	O				O					PO		O	

	0	1	2	3	4	0	1	2	3	4
New practices	-	5	14	15	7	-	6	7	9	11
New enterprises	-	1	3	3	1	-	-	1	3	2
all enterprises	6	7	11	10	8	5	6	7	9	6
CODE - - - -	TJ-TIV					AJ-QJP				
Tenure - - -	O					O				

Fig. 18.—Net earnings to family-furnished labor, land, capital and management, primary cooperators, Barrio Linga, Laguna, Philippines, 1957-1962.

Fundamental Problem Areas of Development Work

One major problem area in development work is lack of knowledge of different possibilities for improvement. A farmer certainly cannot be expected to change his practice if he does not know any other way. Knowledge here means more than just awareness by the farmer of the existing alternatives; it means the ability to decide which alternative is the best for him. The farmer must have enough knowledge of the alternative he chooses to be able to implement it successfully.

To this end, the farm development technicians held result demonstrations. They conducted farmers on field trips to the College of Agriculture and farms of progressive farmers. They discussed alternatives in formal classes and informal sessions. They made use of audio-visual materials.

Another major problem area is lack of motivation to change or improve. This may be considered the most critical problem area. First, motivation influences greatly the behaviour of the farmer. If he is not motivated, he may not care to learn about alternatives. Second, it is not easy to motivate people. The art of motivation is difficult to learn.

The technicians made use of increased income, which in turn can mean better living, as the main motivating factor. However, some farmers who started new projects probably were prompted by the desire to do something novel or different. Still others probably just wanted to please the technicians or show *pakikisama.*

Whole Farm Perspective

Farmers view their farm problems in totality. A farmer wants to discuss not only the small details of his farm; he wants to get answers to all his questions in one meeting. His questions cover everything about his farm.

One method the technician used to tackle the problem head-on was to make farm and home visits. This allowed them and the farmer to discuss just his farm and almost everything about that farm.

The approach during farmers' meetings or classes was different. The farmers were made to realize that it was better to divide and discuss the farm problems by topics or groups of topics to allow the wise use of the specialist resource persons' time. This also enable the farmers to concentrate on topics most timely for discussion.

Extension Methods

Different methods or techniques are needed in extension as in any educational process. Repetition of the same ideas to the learner makes learning effective and lasting. Different methods used in repeating these ideas make the repetition less boring. Different lessons or ideas also need different vehicles for communication.

In the Pilot Study, the personal contact method was most effective. Although it was very expensive in terms of the number of men reached by the service, the end result justified its use. Farmers who could not read did not benefit from bulletins, circulars, or even popular leaflets. Radio and television are not yet sufficiently widespread to be effective. The interest of the few listeners in agricultural programs was possibly aroused by some of the information, but they still had to consult agricultural officials for specific information. Even after group meetings or method demonstrations, many farmers still had to be visited at their own farms and homes for a follow-up. Private demonstrations were still required.

The Recommendations

Specific recommendations have to vary from farm to farm. With the great variation among farmers and farm resources, each farm becomes a separate entity by itself. Some recommendations may apply to many farms, but there will always be differences. Hence even the general recommendation *to apply fertilizers* vary from farm to farm in terms of kind, amount, and timing.

The Extension Worker

The personal qualifications and attributes required of an extension worker will not be less than those of a teacher. The extension worker is a special kind of teacher. He deals with a special group of students — experienced farmers. He has a special environment — the natural and diverse farm conditions.

Workload

The Pilot Study demonstrates the effectiveness of the *concentrated approach.* When the services are spread too thin there is no solid impact. With all the demand for the personal contact method, particularly at the early stages of a new program, no worker can be expected to do much with more than one or two villages. The concentrated approach of the Pilot Study did not stop at the one-barrio-to-one-worker ratio; it also required the technicians to work most closely with only a few primary cooperators. The other farmers got extensive attention. Radiation from the primary cooperators to other farmers within the village justified starting out with only a few. In the Pilot Study, the radiation effect extended new practices first to farmers in the same barrio and later to farmers in other barrios.

Change agencies can follow a scheme in line with the observation. After some headway in one barrio the worker can then shift his close attention to another barrio. This approach promises to be more effective than simultaneous coverage of many barrios.

The Team Approach

The technician must be adequately prepared as an agriculturist to be able to discuss with farmers the farm as a whole. However, it must be recognized that no one agriculturist can master all the facts in the vast field of agriculture. Thus, specialist service is provided by a colleague nearby who may have had a different major field in College or has special knowledge in one narrow field of agriculture. A larger number of lower-level specialists are more effective than a central core of high-level specialists. First, it is not so difficult and time-consuming to get them on the spot as those from a far central office. Second, they are close to the farms and hence more familiar with local farm problems.

The Philosophy of No Free Material Aid

Farmers who have once received free material aid always expect it from the government. It is very difficult for other agencies to establish relationships with these farmers without also giving them free material aid.

In the Pilot Study, however, after proper explanations, the farmers realized that they could improve themselves even without free material aid. They became staunch defenders of this policy when some uninformed outsiders questioned the practice of making the farmers buy their own needs like vaccines, improved stock, and certified seeds.

Lack of Capital

Lack of capital or credit has been cited as the strongest reason for the inability of farmers to improve their lot, but the Pilot Study demonstrated that availability of credit was not very important. Farmer cooperators were able to increase their incomes, adopt new practices, and set up new projects or enterprises without credit. Only those who became proficient in the new practices and enterprises showed more benefits with the aid of credit later. Those who made use of credit without having had improved managerial ability failed.

Relative Reaction of Farmers to Innovations

Most innovations were criticized as having objectionable properties or characteristics. Some criticisms were valid, but many were just first-sight objections. When the farmers realized fully the advantages of the innovation they either forgot or simply ignored the first-sight objections.

Some innovations were acceptable to some but not to others. Different likes and dislike, capabilities, and farm resources influenced the attitude of farmers towards innovations.

Benefits from Visitors

The study barrios were very often visited by various groups, ranging from foreign dignitaries to neighboring farmers. If farmers knew that visitors were coming, they prepared their farms. They would weed their fields, particularly the areas most likely to be visited. They would clean their hog pens or poultry houses.

The farmers who were usually visited continued to improve so they could show some change during the next visits. Those who missed the vists because of relative inaccessibility of their farms complained.

A number of questions should be raised. Should farmers be encouraged to clean their fields, hog pens or poultry houses just for visitors to see? What benefits can be derived from these visits? What are their disadvantages?

Regarding the first question, it is difficult to discourage farmers from showing their best to visitors. However, it is possible to capitalize on this behavior. Efforts should be exerted to make them realize the real benefits of what they do on the farms regardless of visitors.

Visits to the barrio have two-way benefits. On one hand, farmers get helpful observations from the visitors. They also take pride in being able to show something. On the other hand, the visitors learn about farm situations. Classroom teachers widen their perspective of the real world. Researchers get insight into the real problem areas for study. In short, all visitors have the opportunity to learn from farmers.

Potential for Applying Results of Research on Small Farms

The Pilot Study was started because of the observation, among others, that many research results did not find expression or use in small farms. The explanation for this is varied. Most research findings need adaptations. Some are not appropriate to recommend in some areas. It takes someone with training to select what ever is appropriate for the farmers and their farms and present these in a manner and form which could be understood, accepted, and adopted by farmers. Finally, the most important end in farm development is to develop trained farmers and farm families who continuously seek information to improve themselves.

Farmer cooperator Mang Dama turned lecturer when College personnel visited him and his projects. Visitors, whether farmers, teachers or researchers, learn about the experiences of farmers. On the other hand, the farmers also learn from the visitors, in addition to being inspired by them.

More Studies Needed

Teachers of farmers need to know two general types of information. One is information to bring to the farmers. The other is information on how to bring or present this to them.

The first type of information has been the main concern of many research institutions or offices. The second type has not been given sufficient thought so far. The Pilot Study attempts to contribute something in this regard.[4]

Closely related with the second type of information, although it can also be classified independently, is information on farmers' reactions to various kinds of recommendations and the reasons for such reactions.

Some observations in this study may be accepted as valid. Others may need further and more concentrated testing. One example in the latter group which needs to be investigated further is the economic and social implications of some *bayanihan* operations. When costs and returns are computed, it turns out that it is better to hire harvesters directly on daily or contract basis than to let share harvesters harvest the crop.[5] Yet, it is difficult to break the traditional system of having share harvesters do the job without social repercussions. The most common reason for share harvesting is that it has many benefits.

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[4] The Community Development Research Council of the University of the Philippines has supported and published a few studies along this line. See literature citations.

The fact that a farm practice may benefit many people has it own problems. Some farmers claim that they can improve their total farm production if they added new enterprises, like poultry or vegetable growing. However, they do not try any of these possibilities because it is discouraging to exert efforts while others merely wait for their unearned share in the form of *pahingi* or "let-me-have-some".

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[5] In the lowland rice areas, share harvesters — *Bayani* — are paid in kind, usually at the rate of about one-fifth of the total harvest of each individual if he also threshes it, or about one-tenth if he does not thresh it. A good harvester can get a share of from about one-half to almost a cavan of palay for a whole day's work. The buying price of unhulled rice by the government is ₱11.50, but market price can vary from about ₱9.50 to ₱18.00 per cavan. On the other hand, hired agricultural laborers are paid from about ₱1.50 to ₱2.50 per day.

SUMMARY

The Pilot Study in Farm and Home Development first started as a research in farm management. However, it went far beyond the conventional farm management study. It went deeper than the usual cross-sectional description and analysis of the resources, practices, costs, returns, experiences, and problems of farmers. It did not stop with the suggestions or recommendations to farmers synthesized out of the survey results; it went on to involve field workers or technicians who continuously looked for suggestions that could be made to work with farmers. Four technicians were each assigned to a barrio. They interested the farmers in new practices and guided them from the very start of a new practice (or enterprise) until its completion (or harvest). The study had a built-in extension or educational activity which formed the foundation for a study of whether farmers change, why and how these changes are brought about, and the results from such changes.

The study was divided into two major phases: the extension or educational phase and the research or evaluation phase.

The extension phase had features which were different from those of other agencies performing the same function of developing farms and farm families. Among the significant features of the extension approach in the Pilot Study were:

(1) the concentrated approach
(2) the team approach
(3) no free material aid
(4) use of various extension methods, and
(5) recommendation fitted to the situation

The development of the farm was an indirect goal of the farm development project. The central focus of development was the farmers. The main job of the development worker was to educate the farmers.

Farm development is by no means an easy job. Farmers can be more difficult to teach than school children or college students. However, with patience, proper techniques, realistic recommendations, and consistent efforts, farmers do learn and accept new practices in farming.

The results and the experience gained from the Pilot Study in Farm Development have been rewarding for the research group and the farmers. The study will have attained its highest worth when the approaches and principles tested stimulate and accelerate agricultural development on a broader scale.

APPENDIX

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DEFINITION OF TERMS

Ampalaya (*Momordica charantia* Linn.) — a climbing vine with palmante leaves and long rough uneven fruit having broken ridges and a bitter taste. The leaves, tops and fruits are used as vegetables.

Atis (*Annona squamaso* Linn.) — a small deciduous tree with heart-shaped fruit, composed of loose covering carpets rounded at the extremities and grooved on the inner side. The white, creamy, very sweet and pleasantly flavored pulp of the fruit lends itself to the making of good ice cream.

Avocado (*Persea americana* Mil.) — a medium-sized tree bearing fruits that are either oblong, round, egg-shaped or with long slender neck, yellowish to purplish black when ripe, with a single large seed and yellow buttery flesh.

Ayungin (*Therapon plumbeus* Kner.) — a fresh-water fish with an average length of 10 centimeters.

BAE (Bureau of Agricultural Extension) — a bureau under the Department of Agriculture and Natural Resources organized to help through extension work. Now known as Commission on Agricultural Productivity (CAP).

Barrio — a village; a political subdivision of a municipality in the Philipplnes.

Bayanihan — exchange labor; a form of cooperative labor where a farmer returns the work-days spent by other farmers on his own farm.

Calesa —light, two-wooden-wheeled, horse-drawn vehicle for hire, used to transport passengers or farm produce for short distances.

Calamansi (*Citrus madurensis* Lour.) — a small prolific tree bearing fruits that are small, deep orange-yellow when ripe, very acidic and juicy, used for souring food.

Cavan — a measure of volume usually for rice, equivalent to 75 liters or 2.13 bushels (1 cavan rough rice = 44 kilograms; 1 cavan cleeaned rice = 56 kilograms.)

Clustered eggplant (*Solanum melongena* Linn.) — a three-way cross between native long purple, American variety, and Indian variety, resulting in clustered, productive and disease-resistant plants.

Double cropping system of planting two or more crops in the same piece of land in succesion during the year.

Effective crop area — a total area planted in one year with the number of crops considered. If 3 hectares of the total farm area of 5 hectares are planted twice during the year, the effective crop area is 6 hectares.

FACOMA (Farmers Cooperative Marketing Association,) — private cooperative organization of farmers, which markets the farm produce of farmer members and provides them facilities for milling, storing and transportation.

Ganta — measure of volume equivalent to 8 chupas or 2.986 liters or 1/25 of a cavan.

Garlic (*Allium sativum* Linn.) — a bulbous plant grown as an annual. Its strong smelling bulb is used as condiment.

Ginger (*Zingiber officinale* Rosc.) — an herb grown for its aromatic rootstalk used for flavoring foods and as medicine.

Hectares — a metric measure equivalent to 10,000 square meters or 2,471 acres.

Intercropping — farming practice where a crop is planted between the rows of another, usually annual or perennial, crop.

Kaing — basket with an approximate volume of a bushel.

Los Baños Bush Sitao — a dwarf plant about 1/2 meter high bearing pods that are light green and about 25 centimeters long. It is the result of crossing American bush cowpea (*Vigna sinensis* Sav.) and string beans, pole variety (*Vigna sesquipedalis* Fruw.)

Nanka (*Heterophyllus* Lam.) — a bearing tree usually cultivated in the Philippines. The fruits are oblong, rough with protuberant points, greenish yellow when ripe, with strong aromatic odor.

PACD (Presidential Assistant on Community Development) — office directly under the President of the Republic of the Philippines which aims to improve and enrich rural life through the aided efforts of the people.

Palay (*Oryza sativa* Linn.) — rice in the field and up to the time it is milled; cereal that is unhulled. Lowland palay, palay grown in the fields, diked to contain the water — either rain water or applied irrigation. The seeds are usually grown in seedbeds and then transplanted to the field. Upland palay, palay grown on rainfed fields.

Patola (*Luffa cylindrica* Roem.) — an annual crop with long and cylindrical fruit which has greenish white and fibrous pulp.

Pasik — or purple blotch, a disease of garlic caused by a fungus, *Alternaria porri* (Ellis) Cif. (=*Macrosporium porri* Ellis.)

Peso — the monetary unit in the Philippines. The official equivalent of one peso in U.S. currency is a little less than 26¢ (as of June 13, 1963).

Peste — local name for epidemic. In poultry, it refers to new castle disease considered the most dangerous disease of chickens in the Philippines; when it occurs in the flock mortality ranges from 80 to 100 per cent.

Seguidillas (*Psophocarpus tetragonolobus* D C) — a perennial, climbing legume, bearing long, tender and four-cornered pods.

Shares in kind for services — the percentage of total production going to harvesters and threshers, irrigation fee and seeds. Payment is usually in kind.

Siniguelas (*Spondias purpurea* Linn.) — a small spreading and deciduous tree with pinnate leaves; the fruit is oblong, smooth, dark purple or yellow and contains a large, stony seed.

Sintones (*Citrus nobilis* LO.), a widely distributed fruit tree in the Philippines: the fruit is from small to large, rounded to oblate, usually compressed at the base and orange to reddish orange, flesh or orange yellow in color, juicy and sub-acidic.

Upo (*Lagenara leucantha Rusby*) — very common vine in the Philippines producing light green or spotted fruits that are either round, long, oblong, bottlenecked and conical.